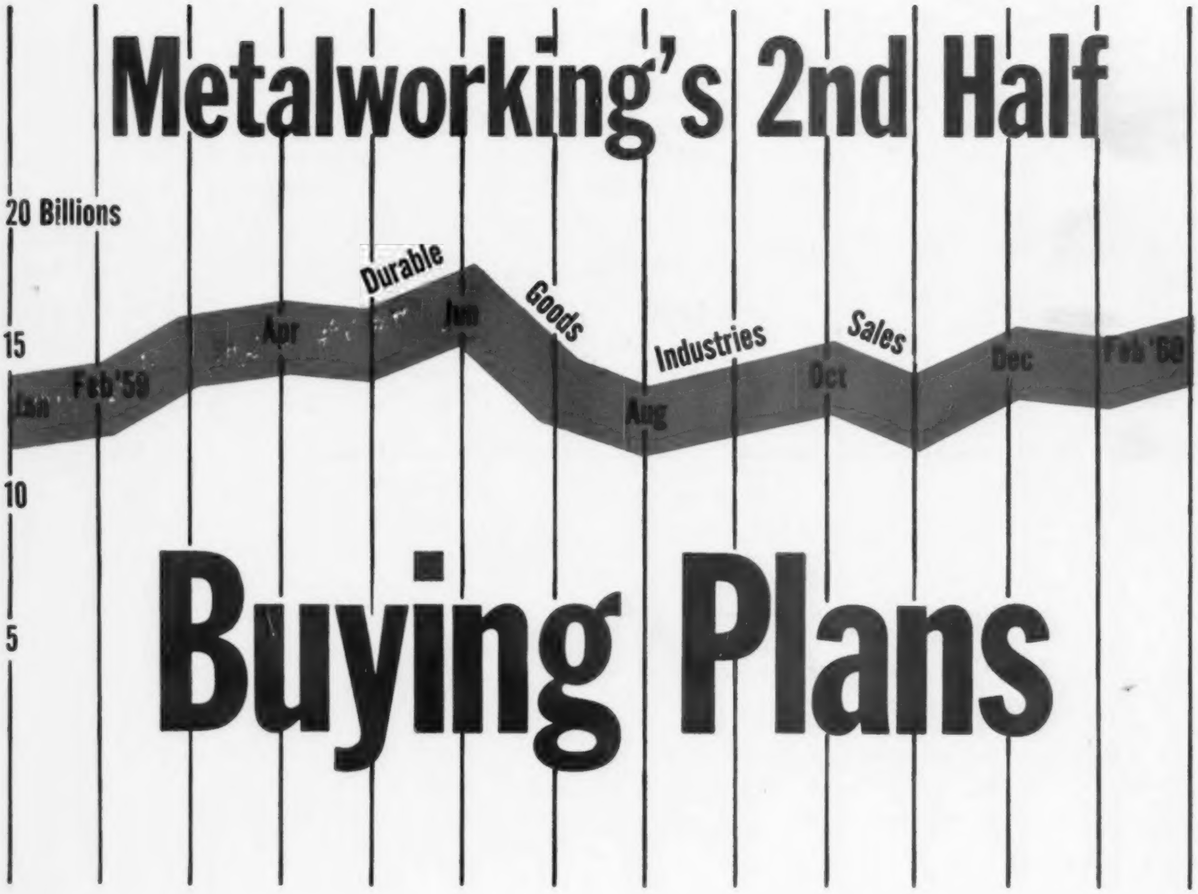
The IRON AGE

April 28, 1960 A Chilton Publication The National Metalworking Weekly

Metalworking's 2nd Half Buying Plans



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Automation Halves Foundry Space Needs — P. 101

Buying Locally Pays — P. 140

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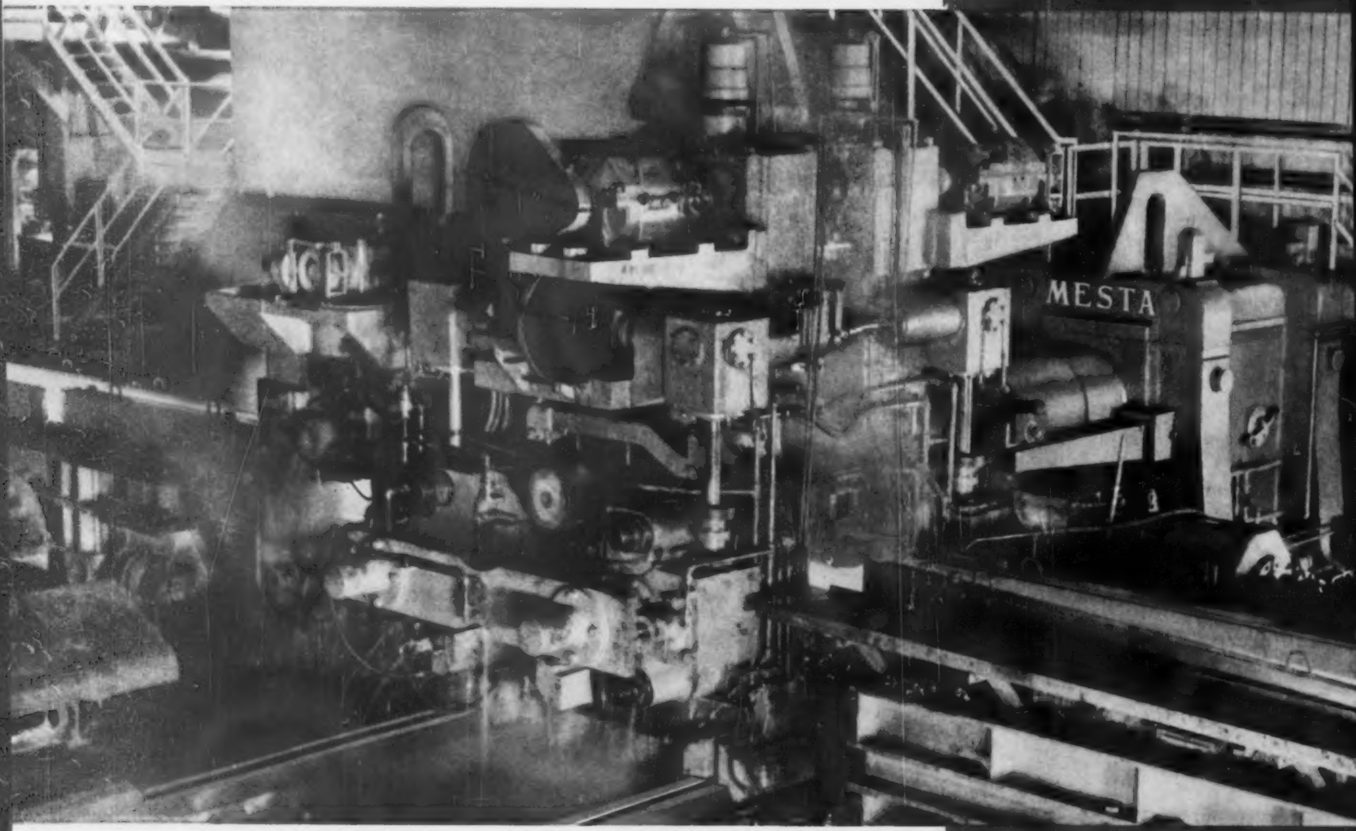

Mesta Universal Structural Mill Rolling Wide Flange Beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

WIDE FLANGE BEAM
AND
STRUCTURAL MILLS

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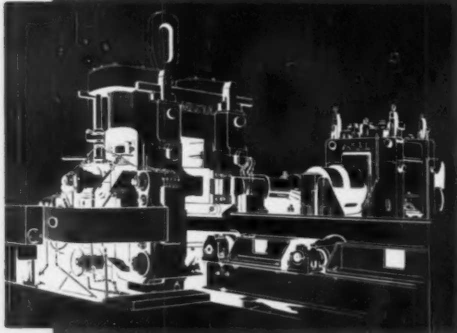
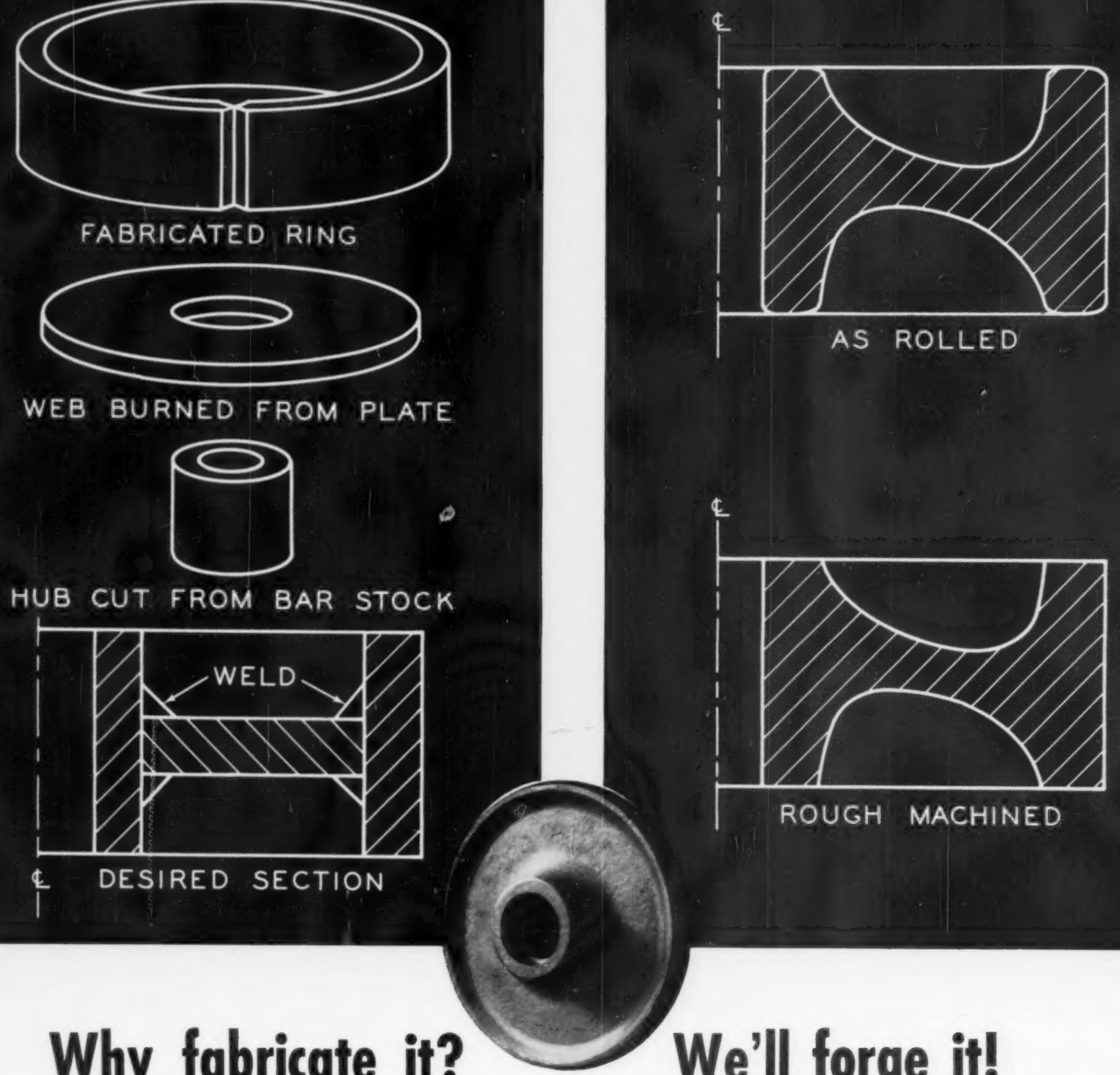
MESTA



Designers and Builders of Complete Steel Plants
MESTA MACHINE COMPANY
PITTSBURGH, PENNSYLVANIA



Why fabricate it?

(and pay for waste metal, assembly time, welding?)

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Bethlehem Circular Forgings come ready for finish machining. Unlike a weldment, there's no fabricating to be done. No assembling. No welding. You save the high cost of all those operations—and the cost of the metal those operations waste.

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The IRON AGE

April 28, 1960—Vol. 185, No. 17

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News of the Industry

INDUSTRIAL DEVELOPMENT

Competition—Industrial development groups are hotly competing for new industry. Here Pennsylvania

Railroad officials and a Motor Wheel Corp. executive look over plans for a newly located Motor Wheel Plant. This plant is typical of hundreds being relocated yearly. P. 68

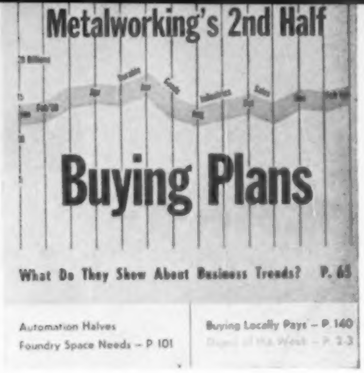
NUCLEAR PLANT

Peaceful Power — The Nation's first privately financed, nuclear power plant has gone "on stream" at Chicago. The $45 million plant, currently generating at a 90,000 kw rate, will hit an output of 180,000 kw this summer. P. 69

LABOR ISSUES

Look Ahead to 1962—Many of the issues of the last steel strike are still smoldering. Editor-in-chief Tom Campbell analyzes the steel labor situation in light of past and present developments. P. 70

Metalworking


Metalworking's 2nd Half

Buying Plans

What Do They Show About Business Trends? P. 65

Automation Halves Foundry Space Needs – P 101

Buying Locally Pays – P 140

Cover Feature

BUYING PLANS—A survey of industry purchasing executives shows they have mixed feelings about the second half. Many factors affect their thinking, so no clear pattern develops for the last half. P. 65

WEST COAST

Shipbuilding Comeback — After its post-World War II nosedive, shipyard work in the Farwest is picking up. Puget Sound company has large Navy contract, more freighters are being built. P. 87

Engineering-Production Developments

FOUNDRY AUTOMATION

Doubles Production — Here's a foundry that caught up with the demands for higher production rates by using automation. Even though the new setup is not expensive, it's increasing yield by two-fold in only half of the previous amount of work space. A completed mold is turned out every 15 seconds. P. 101

TOOL STEELS

Cast to Shape—Why buy metal you don't use? The cast-to-shape method can produce dies, rolls or machine parts from tool steel composition. Many parts now machined from steel forgings can be handled economically through casting. Another advantage is the high compressive strength of the metal. P. 104

IRRADIATION

Its Affect on Metals—Designers must consider the effects of nuclear fission on the life of equipment. When fast neutrons penetrate metals the mechanical properties of the metal are changed. P. 106

REFRACTORY METALS

Welding Them — Embrittlement is a common problem in welding molybdenum or tungsten. Electron beam welding appears to be the answer. This technique allows close control of grain size and keeps the impurities picked up in the welding atmosphere in check. P. 108

VAPOR-PHASE PLATING

On Substrate Materials — It's intriguing to be able to create alloys of tungsten at temperatures of less than one-tenth their melting point. That's just one of the developments promised by the versatile vapor-phase process. Adhesion is a key trait of the method. P. 112

Market and Price Trends

RESEARCH IDEAS

Suggestions Plan — Executive suggestions are key to broadscale research plan at American Brass Co. Company looks for any idea that will "keep company competitive." P. 72

WASHINGTON

Economy Pep-Up—In the face of lagging sales and payrolls in an election year, the administration is set to speed up the economy starting early in the third quarter. P. 85

STEEL SUMMARY

Headed Down — New order pickup can't halt downward trend in operating rates. Order pickup must be weighed against the low rate of new orders in recent weeks. Even with the pickup, the rate of new orders will scarcely support a 50 pct rate. But inventory correction is about ended. P. 139

PURCHASING

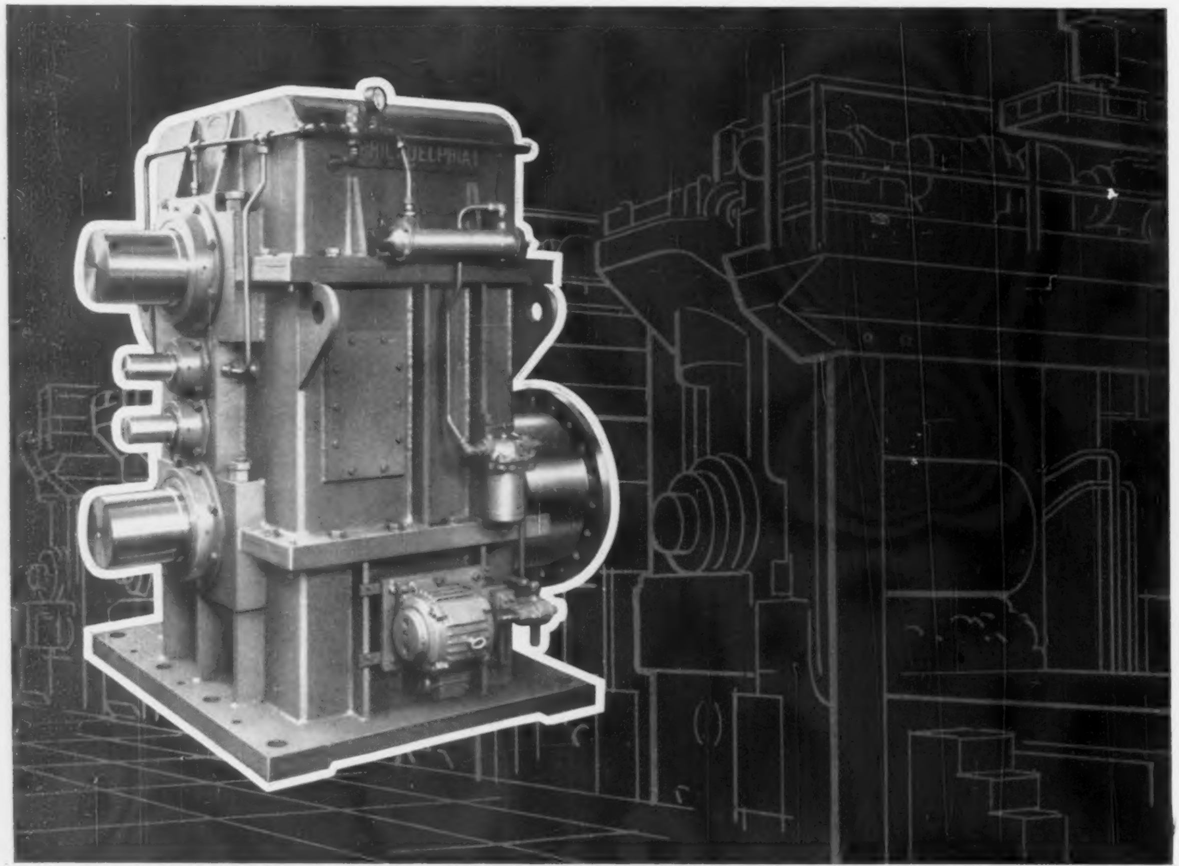
Local Buying — Decentralized buying helps keep a smooth running purchasing department. And it means better and less costly production. P. 140

NEXT WEEK

WORLD AUTO MARKET

Expansion Is Underway—The market for automobiles outside the U. S. is heading into a period of rapid expansion. Foreign automakers are boosting capacity to meet the demand. But it means more business here, too.

IMPROVED GEARS = (MORE POWER + LONGER LIFE)



This rolling mill pinion stand is a typical example of how Philadelphia Precision Ground Gearing is revolutionizing large mill drives.

Radically improved gear accuracies reduce dynamic load factors . . . gearing has increased load carrying capacity. Result: you can save space, increase speeds, transmit more power and get longer life. And in most instances, Philadelphia can furnish precision ground gear drives at no greater cost than conventional and special drives now being used.

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"We have learned to rely on Sharon for top quality Stainless Steels"— JOHN SHRAGG, Foreman of the Press Dept., Ekco Products Company

"Modern utensil design calls for real workable stainless steels," says John Shragg, press room foreman at Ekco Products Company's Massillon, Ohio, plant. "For consistently fine quality," he continues, "we have found we can always rely on the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL** Steel

Running a Business: It Gets Tougher Every Day

The usual thing to say when anyone gripes is to remind them that it was always that way. But there seems to be one problem that is not the same as in the "good old days." And that is the job of running a small or medium-sized company.

The thought that flits across many a president's mind is to flee to the hills and give the business to the unions and the government. On second thought, most presidents feel that they have almost come to that point. It is only a question of how long it will take for the union, the workers, the customers, and the government to take over completely.

Big companies have their troubles too. But it may be stretching things a little to say that they have the same troubles that fret smaller firms. Small or medium firms don't make labor contract patterns. Nor do they have big research departments, carloads of money, lots of sure-fire products and the wherewithall to hold on come hell or high water.

The threat of imports is only one of the problems of the smaller firm in metalworking. Most presidents of firms that are struggling against high wages, fringes, price cuts (one way or another) customer fickleness ("variety of choice"), co-ops, old machinery, limited money, and small surpluses now face rugged foreign competition.

They can't live long enough for higher wages abroad to force a change. Nor can they wait until all of Europe and Asia go on an installment buying basis—like us.

It would be suicide to drop prices to meet foreign competition. With the mood of the government and the world against high tariffs, it may be wishful thinking to expect help from that area. And to spend too much time dreaming about quotas could mean loss of business while the dreaming goes on or until relief might come.

What with labor costs, competition, new equipment needs, market research requirements, and wide economic fluctuations, the squeeze of the 60's is already here.

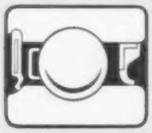
It is now a question of holding on, using everything in and out of the book and hoping that labor—sooner, rather than later—finds out that its future is industry's future.

Maybe some hardworking presidents appear to be off their rockers when they try to keep the old firm going. But then, maybe there is nothing they can do about it except hope, work, and work.

Tom Campbell

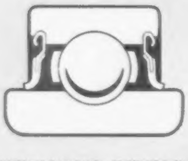
Editor-in-Chief

PRODUCT INFORMATION



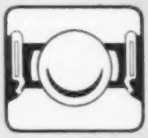
NEW LAND-RIDING SEAL (Pressed) and SENTRI-SEAL

This exclusive seal combination is available in N/D's new heavy-duty conveyor ball bearings. Land-Riding seals, especially resistant to moist contaminant penetration, are available separately in N/D's bearings for hay rake tine bar, plow, hiller and coulter applications. Tandem seal arrangements are also available.



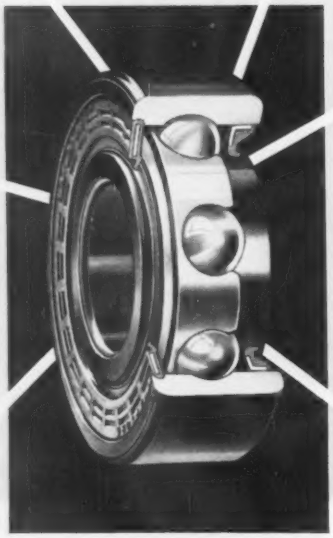
NEW LAND-RIDING SEAL (Crimped)

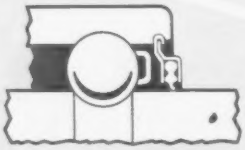
N/D's newest seal design. Efficient single lip, low-torque seal protects against moist or dry contaminants. Retains bearing lubricant-for-life. Recommended for farm implement discs, idler pulleys, wheels and similar applications. Available also with metal trash guards to protect seal against mechanical damage from trash windings.



NEW SENTRI-SEAL

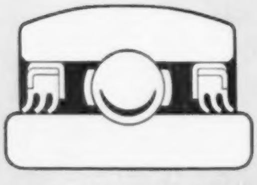
N/D's most versatile seal . . . available in most single row, non-loading groove and small double row N/D ball bearings. N/D Sentri-Seals are recommended for applications with moderate to severe contaminant conditions as found in light duty discs, idler pulleys, cam followers, implement wheels, adapter bearings and similar applications.





NEW DOUBLE "O" SEAL

N/D's most original seal design, used in fan and water pump bearings where water seepage is prime source of bearing contamination. Synthetic rubber seal rides smooth shaft O.D., offers reliable low-torque sealing and eliminates relubrication.



NEW TRIPLE LIP SEAL

N/D's most rugged seal . . . used where moist and dry contaminant conditions are most severe. Seal eliminates relubrication maintenance. It's available in N/D square and round bore ball bearings with either spherical or cylindrical O.D.'s.

N/D Introduces 5 New Integral Ball Bearing Seals!

Now, New Departure offers a versatile line of new integral seals for N/D precision ball bearings. Each N/D seal is engineered to retain bearing lubricant for life . . . and offer maintenance-free service. These seals are designed to give manufacturers a broad selection to choose from for a specific application.

Modern design N/D seals are made of synthetic rubber with supporting steel components for precise control of sealing lip flexibility and torque. Whatever the application, you'll find an N/D integral seal and ball bearing to fit it. All seals are available in popular sizes of New Departure ball bearings.

Write today for N/D's Integral Seal Bulletin. For detailed information, contact the N/D Sales Engineer in your area. New Departure Division, General Motors Corporation, Bristol, Connecticut.

NEW DEPARTURE
BALL BEARINGS
proved reliability you can build around

Automated Roll Dressing

Under development is a new automation unit that will close the circuit in machining. It's for turning steel-mill rolls. The unit will inspect a worn roll and determine the depth of dressing needed. A memory device will record this information and feed it to the control system. Tapes will direct the turning operation for tapers, speeds and feeds.

Ductile Ceramic Tools

Experiments with magnesium-oxide crystals—doped with nickel oxide and chromium oxide—show promise in the development of more ductile ceramic tools. Researchers at the Norton Co. have obtained relatively ductile ceramic crystals with yield strengths much higher than those of undoped crystals. The doped crystals also exhibit good plastic behavior.

Yield Better Sand Cores

Despite its high initial cost, olivine sand for green-sand molds and cores—as well as shell molds—is gaining increasing acceptance. Chief advantage over silica sands appears to be a lower dimensional change during casting operations.

Lowers Welding Costs

Flat welding wire and a new, expandable contact tip have combined to reduce aluminum and magnesium welding costs by about $40,000 per year at the Ordnance Dept. of General Electric Co. The flat wire feeds more evenly than round wire and stops burnback. The contact tip provides the added benefit of better current pickup.

Tantalum Holds Promise

A recent report from Union Carbide Metals Co. indicates that arc-melted and electron-beam-melted tantalum shows promise for both low- and high-temperature uses—from —321° to +2000°F. Studies of mechanical properties and behavior characteristics pave the way toward more use of tantalum as a high-temperature structural material. Use of tantalum has already increased in the chemical processing, medical and electronics fields.

Bumper Competition Is Hot

Competition for the automotive-bumper business in the 1961 model year is getting hot. Both steel and aluminum companies have new prototypes making the rounds of auto-test labs. One steel bumper drawing interest is stainless in front and clad stainless in back. Bumpers produced from heat-treatable aluminum alloys are also gaining interest. The aluminum bumpers are plated with a nickel-chrome finish.

Gage Small-Bore Coatings

Accurate measurement of a coating thickness inside small-diameter tubes is now possible by means of miniature gages designed by the National Bureau of Standards. These gages make use of a reflected field from eddy currents induced in the specimen. They are capable of measuring internal coatings in 0.3-in. ID tubes.

Step up Steel Campaign

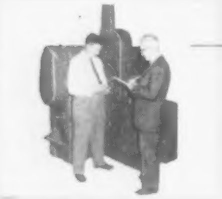
Next month a major steel mill will kick off an aggressive program aimed at increasing steel applications. Program points include: calling attention to a wide range of existing steels and services; prodding design engineers to use more originality in specifying steels; and stepping up technical assistance to designers.

Brighter Aluminum Alloy

A new aluminum alloy, designated 5657, is reported to be the brightest, most corrosion-resistant alloy ever offered to the automotive and appliance industries. Applications for 5657 include interior and exterior trim for automobiles —along with many uses in the appliance field. The new alloy is available in both flat-sheet and coil forms.

Get the right abrasive for your flat surface grinding with the Gardner Service Plan

Only Gardner combines abrasive and machine experience, because only Gardner makes both! And Gardner Abrasives Specialists concentrate on disc grinding. For maximum production, longer disc life, investigate the Gardner Service Plan:



1

A survey of your grinding operations.

2

An actual in-service trial of Gardner Discs.

3

A close check of the results.

The Gardner Abrasives Specialist in your area will call at your request.

GARDNER

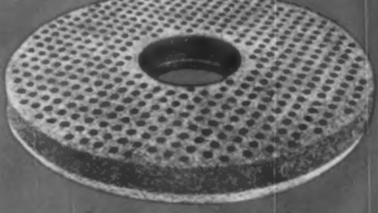
abrasive discs

BELOIT, WISCONSIN

Gardner WIRE-LOKT discs

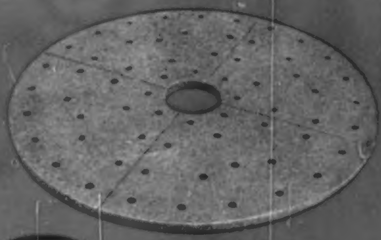
smooth face

combination grade

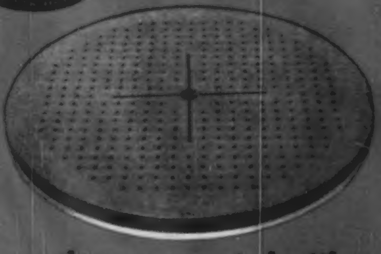


deep corrugated

cylinder type



segmental



deep corrugated with radial lines

LETTERS FROM READERS

Taxpayers Rebellion

Sir—Compliments on "Taxpayers Rebellion." As I see it, my reaction is: "It is not yet in the making." I think the rumbling will crystalize into more action.

More must be done to reach the mass voters and show that they are equally affected. It is not business alone. There is no relief in either party, they are both for more spending.

I was very hopeful when Eisenhower was campaigning in 1952. The spenders won him over quick and he proved the biggest spender of all time.

Leaving it to the individual, all will agree but few will do anything about it.

I have about worn myself out the last 10 years writing and talking about "Stop this going to Washington for financial assistance for anything." I am against more committees, we have too many now, but I see no other solution.

A good strong national committee reaching out into states, countries, and municipalities establishing committees of doers. A tremendous job. Believe it could be done. All that is needed is a group of starters.—W. A. Boesche, The Ornamental Iron Work Co., Akron, O.

Survival

Sir—In the March 24 issue of The IRON AGE there appeared an article titled "Emergency Quarters Set Up by J & L." The National Survival Association would like permission to reprint this article in its monthly publication, "The Outdoor Reporter."

The National Survival Association is a non-profit organization formed by a group of citizens interested in outdoor living and survival training for preparedness in living under adverse conditions, such as might be caused by a major disaster or an atomic war.

Permission to reprint the material will be greatly appreciated.—M. E. Taylor, Pres., National Survival Association, Los Angeles, Calif.

Permission granted.—Ed.

Outstanding Report

Sir—Recently a copy of The IRON AGE Marketing Report for Management came to my attention. It is an outstanding contribution to the field of knowledge concerning the marketing of products of the metalworking industries. Likewise, it has valuable market information for their suppliers of raw materials and components.

I would like to distribute a copy of your report to each of the industry divisions and offices of BDSA for their reference and guidance. For this purpose we would need about 30 copies.—W. A. White, Sr., Administrator, U. S. Department of Commerce, Washington, D. C.

Copies are on the way.—Ed.

For a Penny

Sir—Your editorial in the April 14 issue "Taxpayer's Rebellion" was an excellent one and I heartily concur in your opinion.

As an opinion molder, I think you will be interested in the contents given in the inside of this leaflet.—E. R. Mons.

The attachment was entitled "Stay Away—U.S.A., The Summit Leads to Disaster." For copies (1¢ ea) write Mr. Mons at American Opinion, Belmont 78, Mass.

Slight Delay

Our Reader Service Dept. has been swamped with requests for reprints of the article, "How to use Break-Even Charts in Your Decision Making" which appeared in the March 24 issue.

Because of the heavy demand the supply of reprints has been depleted and there will be a slight delay until more are run off. But as soon as they come in they will be mailed to those requesting them.

Southern SPECIALIZES in

Standard Fasteners for METAL

Whether your fastener requirements call for steel, brass, silicon bronze, aluminum or stainless steel, Southern Screw specializes in first-quality standard fasteners for metal applications.

If your specifications are for cadmium, zinc or nickel plated finishes, Southern's own plating department can plate your order overnight if desired. This service can mean substantial savings in time and money, eliminating extra expense where fasteners are made in one location and shipped elsewhere for plating. More important, Southern plating assures your order of constant quality control from manufacture through shipment.

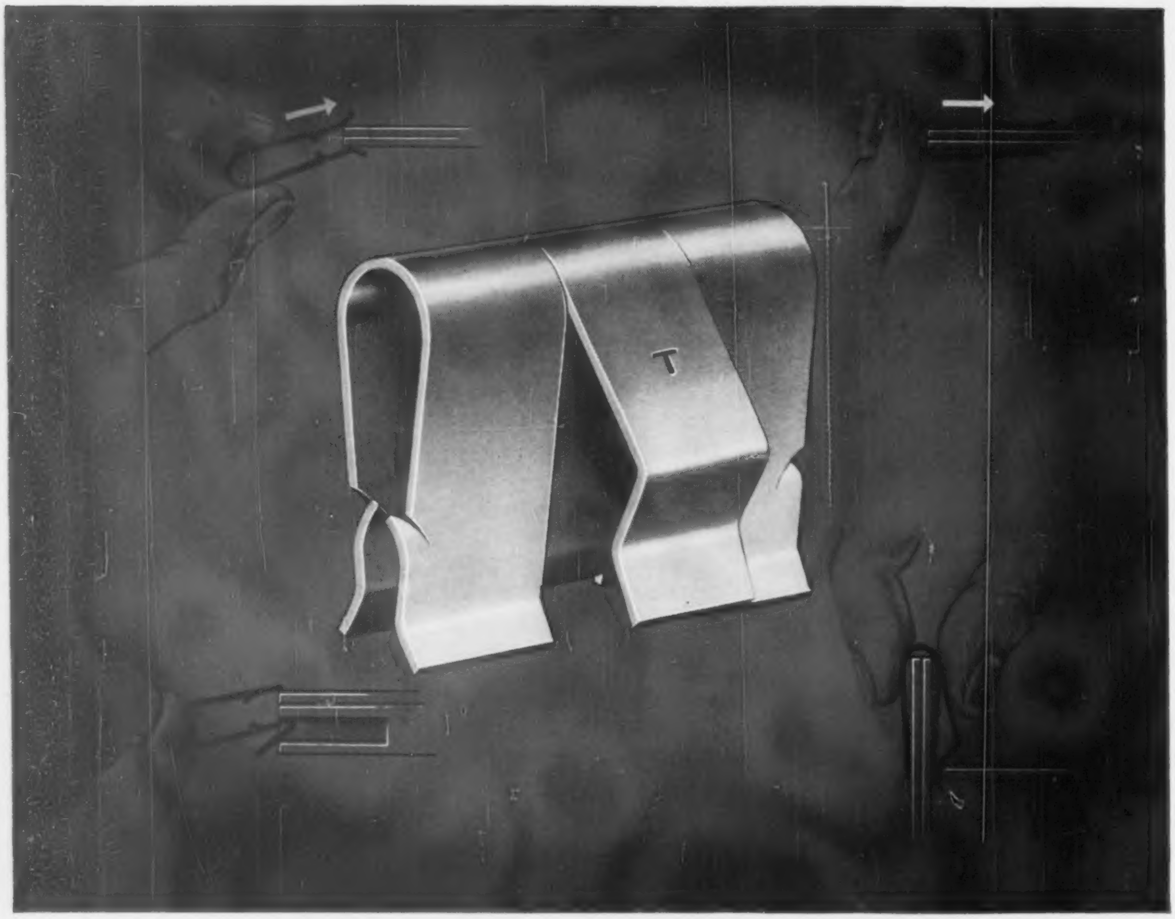
Order today from Southern Screw's inventory of 1,500,000,000 quality fasteners. The specials you need may be in our stock as standards. For super service on fine fasteners, address: Southern Screw Company, P. O. Box 1360, Statesville, N. C.

Manufacturing and Main Stock
in Statesville, North Carolina

WAREHOUSES:
New York • Chicago • Dallas • Los Angeles

Machine Screws & Nuts • Tapping Screws
Stove Bolts • Drive Screws • Carriage Bolts
Continuous Threaded Studs • Phillips,
Slotted and Hex Head Styles

Southern
SCREW COMPANY
STATESVILLE • NORTH CAROLINA



Another SPEED NUT brand fastener...

Just a thumb-push...and steel teeth fasten steel with Tinnerman "U" CLIPS

Twin-action gives this Tinnerman "U" Speed Clip® extra holding power in fastening together two sheets of metal, plastic or wood without screws . . . the heat-treated spring steel tension in the "U" exerts a clamping action . . . the tiny upset barbs bite in and hold on for keeps.

Cost of assembly is substantially reduced when you use Tinnerman "U" Clips for fastening . . . extra assembly steps are eliminated . . . no special tools or skills are required . . . and Tinnerman "U" Clips hold for good!

Speed Nut Brand "U" Clips are easy to apply . . . merely thumb-push them over the edges of the panels. A variety of Tinnerman fastener features can also be incorporated with the "U" Clip principle . . . cable clips, protruding legs to hold glass panels in lighting fixtures, and others.

Call your Tinnerman Speed Nut representative today . . . if he's not listed in your "Yellow Pages" Directory under "Fasteners", write direct.

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano Bundy GmbH, Heidelberg.

In Focus

Our Pittsburgh editor, George McManus, has stepped from the pages of The IRON AGE and onto the TV screen.

He's not another John Barrymore, but he does quite a job as a panelist on Pittsburgh's WIIC-TV show "Focus on Foreign Affairs." With a member of the Foreign Policy Assn., and a reporter for the Pittsburgh Post Gazette, George questions visiting dignitaries on economic, political and other situations in their countries.

Down to Business—But he waits particularly for appearances made by visitors such as one made recently by a top Malayan official. Here he is able to get right down to business and see what is happening in the metal industry in these nations.

With the Ambassador of Ghana, W. M. Q. Halm (see below), George was able to discuss the importance of a power dam being built there and the possibility that Ghana will enter the aluminum field as a refiner.

Perchance to Dream

There are two ways to get to sleep. One is to get hit over the head and the other is to lie down on something comfortable, close the eyes, and wait.

These are the methods described in the new U. S. Steel Corp. book, "The Wonderful, Wacky World of Sleep." The booklet, filled with colorful drawings of sleepers and their problems, takes you into the unknown, witty and serious sides of the bed.

Black and White — Everyone dreams, the book says, and dreams are nothing to worry about. But, dreams in more than one color are looked upon as unusual. Another helpful hint: "Don't sleep in a room where there is no air. If you do, you'll be dead in the morning."

And, in the purchasing end, there are some hints on buying the right mattress. The best, the book implies, are those using sturdy steel springs.

ON CAMERA: IRON AGE Pittsburgh editor, George McManus, right, questions the ambassador from Ghana, W. M. Q. Halm, on economic conditions in that country and the potential part Ghana may play in metalworking.

Ultrasonic Flaw Detection now Ultra-Practical in every shop!

THE NEW BRANSON

SONORAY®

MODEL 5

pulse-echo type instrument

combines the highest performance yet achieved with the smallest size, weight and price in the field. It is equally at home in contact and immersed work.

Every metalworking shop can now afford quick, accurate, inexpensive tests on internal structure of Bar Stock, Strip, Plate, Castings, Weldments. Brazed Assemblies, Machinery Shafts, etc.

SONORAY® Ultrasonic Flaw Detector testing aluminum bar stock; easily probes the full 12-foot length as well as through thickness.

SONORAY® Model 5 clearly resolves 3/64" FBH at 3/16" in contact at 2.25 mc/s — reveals 1/64" FBH full-scale at 2.25 and 5.0 mc/s — brings laboratory precision into the field with simplified controls, a weight of only 37 pounds and a price of . . . . **$2750.**

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23 Brown House Road, Stamford, Conn.
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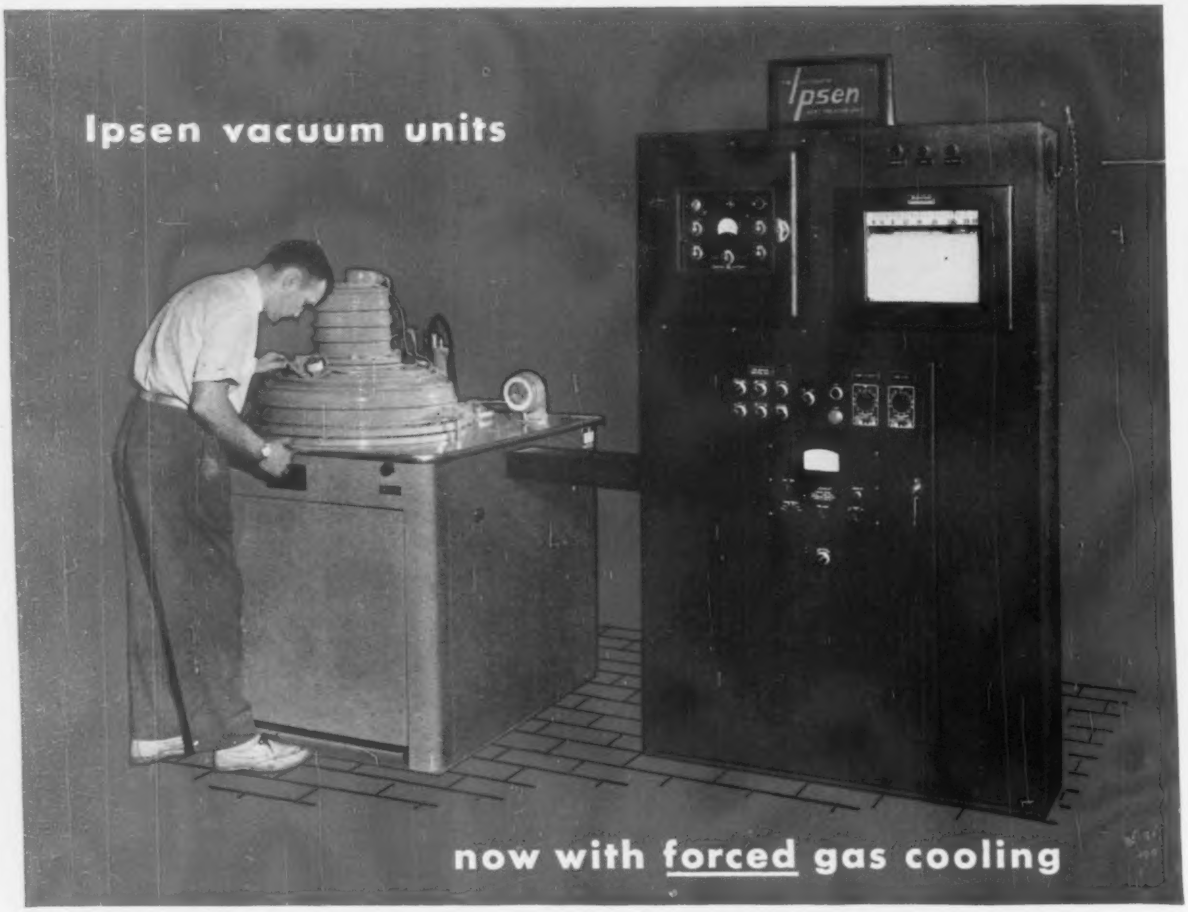
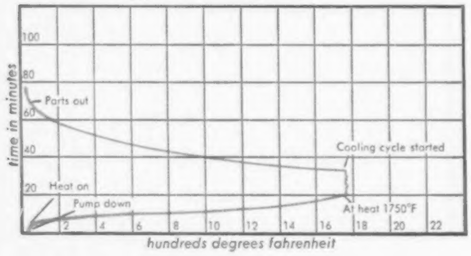
ADDRESS___________________



Ipsen vacuum units with *fast gas cooling* now offer a safe and economical method for bright hardening and annealing of stainless steels, high-speed steels, tool steels, and high temperature alloys; also, sintering and brazing of high temperature alloys!

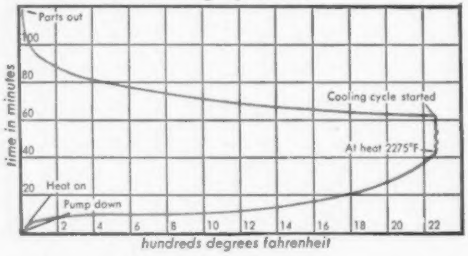
Here are typical examples of performance by the VVFC-1014-E furnace pictured above:

PARTS: Aircraft quality screw fasteners
MATERIAL: Type 410 stainless steel



COMPLETE TIME CYCLE: 1 hour 8 min.
RESULTS: Rockwell C 42-43
APPEARANCE: Exceptionally bright

PARTS: Boring bars
MATERIAL: Rex M-2 High-speed steel



COMPLETE TIME CYCLE: 2 hours 10 min.
RESULTS: Rockwell C 64-66
APPEARANCE: Exceptionally bright

A complete line of standard vacuum units is available. Also, vacuum facilities are available in which processing, testing, and analysis can be made to recommend the proper equipment for your parts. For detailed information contact Ipsen Industries, Inc.

AUTOMATIC
Ipsen
HEAT TREATING UNITS

IPSEN INDUSTRIES, INC. • 725 SOUTH MAIN STREET • ROCKFORD, ILLINOIS

COMING EXHIBITS

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

MAY

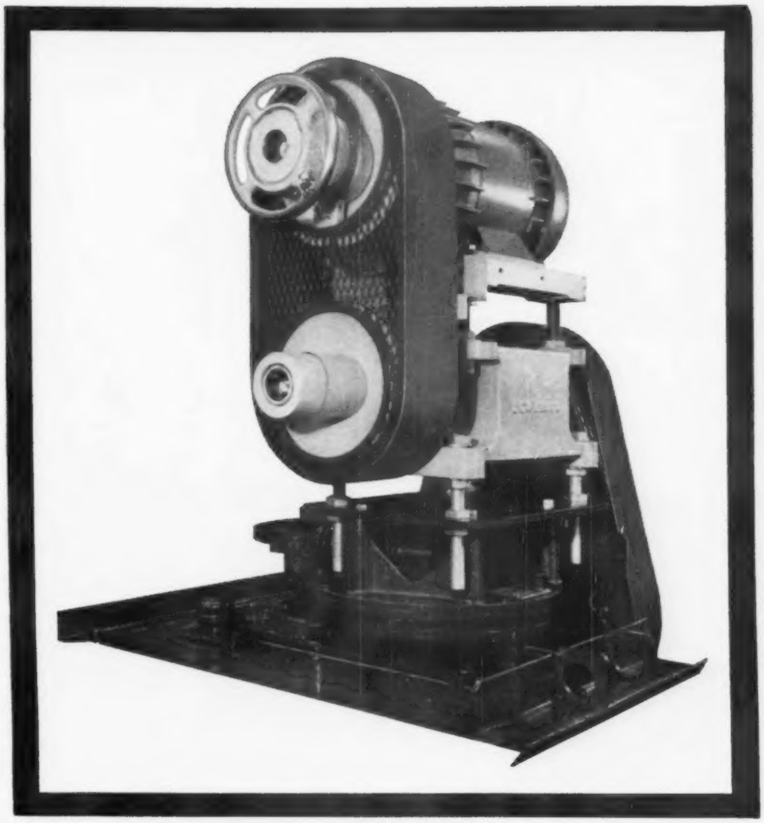
National Assn. of Architectural Metal Manufacturers—Annual convention, May 1-7, Boca Raton Hotel & Club, Boca Raton, Fla. Association headquarters, 228 N. LaSalle St., Chicago.

Wire Assn. — Regional meeting, May 4-5, Sheraton Hotel, Philadelphia. Association headquarters, 453 Main St., Stamford, Conn.

American Institute of Steel Construction, Inc.—Engineering conference, May 5-6, Brown Palace Hotel, Denver. Institute headquarters, 101 Park Ave., New York.

National Machine Tool Builders Assn.—Spring meeting, May 5-6, The Roosevelt Hotel, New York.

(Continued on P. 16)



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COMPONENTS PACKAGE YOUR VARIABLE SPEED DRIVE

Standard LEWELLEN components assemble with your motor for a compact variable speed unit.

Here is all the convenience of a packaged drive, ready to connect to your equipment—at a reasonable cost.

LEWELLEN Variable Speed Pulleys offer finely graduated speed adjustments over wide speed ranges, with excellent horsepower characteristics, plus overload capacity.

LEWELLEN Pulleys present no problems. Just the two shafts mount the pair of pulleys shown. Shaft and bearing loads are normal. No thrust loads are imposed.

The performance you may expect, as well as the convenience and utility of LEWELLEN Variable Speed Pulleys is explained in Catalog 70.

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The **first**

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ULTRASONIC CLEANING SYSTEM

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PLUS

SONEX

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formulated for faster, better, more economical cleaning of all materials!

SONEX Ultrasonic Cleaners, powered by high efficiency *strip* magnetostrictive transducers of unique and patented design, give you the most effective cleaning power available today. Grease, oxides, plaster, resins and other contaminants *disappear in seconds* from all kinds of metals, plastics and other materials, no matter how intricate or delicate the device.

And SONEX gives you much more. Our labs have developed a complete line of specially formulated chemicals to handle every specific cleaning problem. Thus cleaning action at low concentrations is possible, costs are cut and results are far better.

SONEX heavy duty magnetostrictive cleaners are less expensive, more dependable and operate at temperatures as high as you need with complete reliability. SONEX low-concentration chemicals do a better job than any other cleaning agent. Together they make an unbeatable package.

Interested? We'll be glad to show you *results* on your own materials!

THE HARRIS TRANSDUCER CORPORATION
Subsidiary of General Instrument Corporation
WOODBURY, CONNECTICUT, COngress 3-2116

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MEETINGS

(Continued from P. 15)

Association headquarters, 2139 Wisconsin Ave., N. W., Washington, D. C.

National Fluid Power Assn.—Spring Meeting, May 8-12, Grand Hotel, Point Clear, Ala. Association headquarters, 5595 N. Hollywood Ave., Milwaukee.

Machinery Dealers National Assn.—Annual convention, May 11-14, Edgewater Beach Hotel, Chicago. Association headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

The Anti-Friction Bearing Mfrs. Assn., Inc.—Annual meeting, May 11-13, Westchester Country Club, Rye, N. Y. Association headquarters, 60 E. 42nd St., New York.

American Steel Warehouse Assn., Inc.—Annual meeting, May 15-18, The Fontainebleau Hotel, Miami Beach, Fla. Association headquarters, 540 Terminal Tower, Cleveland.

Copper & Brass Research Assn.—Annual meeting, May 15-18, The Homestead, Hot Springs, Va. Association headquarters, 420 Lexington Ave., New York.

Electronic Industries Assn. — Annual convention, May 18-20, The Pick-Congress, Chicago. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

National Assn. of Purchasing Agents—Annual international convention and Inform-A-Show, May 22-25, The Biltmore Hotel, Los Angeles. Association headquarters, 11 Park Place, New York.

Industrial Heating Equipment Assn., Inc.—Annual spring meeting, May 22-25, The Homestead, Hot Springs, Va. Association headquarters, 1145 19th St., N. W., Washington, D. C.

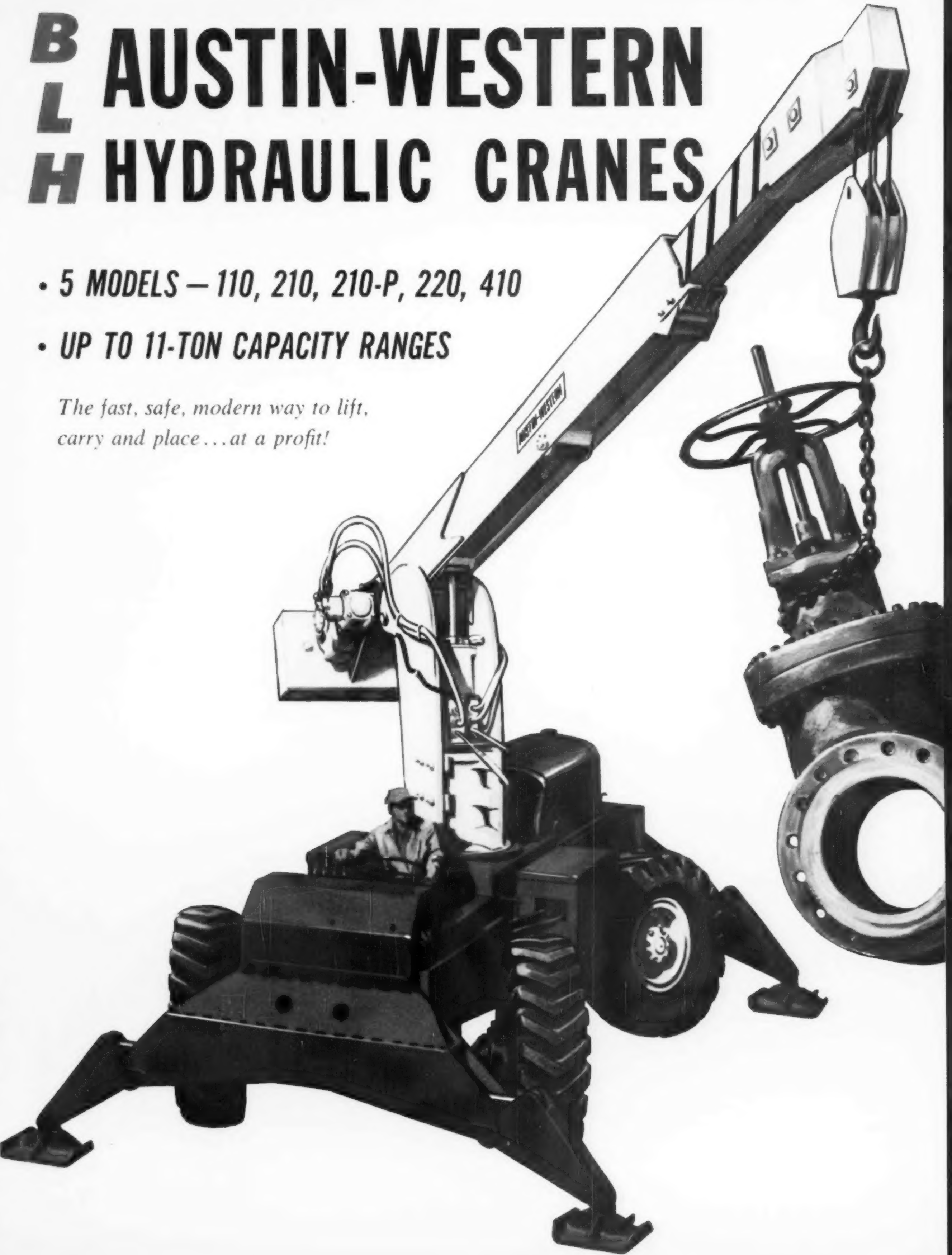
Aluminum Wares Assn. — Annual meeting, May 23-24, Greenbrier, White Sulphur Springs, W. Va. Association headquarters, First National Bank Bldg., Pittsburgh 22, Pa.

BLH

AUSTIN-WESTERN HYDRAULIC CRANES

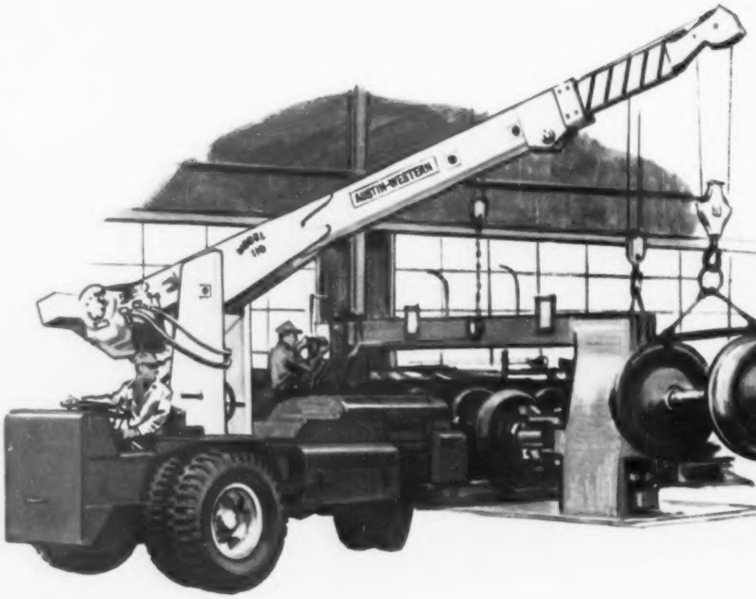
- *5 MODELS — 110, 210, 210-P, 220, 410*
- *UP TO 11-TON CAPACITY RANGES*

The fast, safe, modern way to lift, carry and place . . . at a profit!



Austin-Western's telescoping delivers unequaled precision,

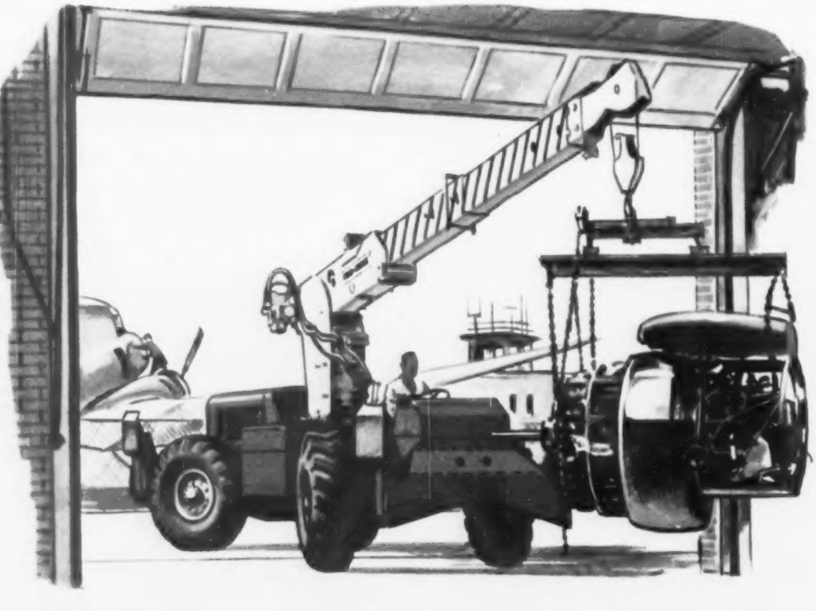
MODEL 110



5-ton range — The 110 is the mighty midget of the A-W line—but what a midget! It'll outlift all other 3-wheel cranes over-the-side! It's industry's answer to fork truck limitations. The 110 has an 18 ft. 7 in. boom reach; 220° boom swing. Low 8 ft. 10 in. overhead clearance. Operates with ease in close quarters; handles loads in 5-ton range.

Features dual front driving wheels; dual tire rear trunnion power steer — road speeds from 2 to 18 mph. Torque converter and full hydraulic reversing mechanism standard. The unit can be tailored to your particular job needs with various combinations of features and equipment.

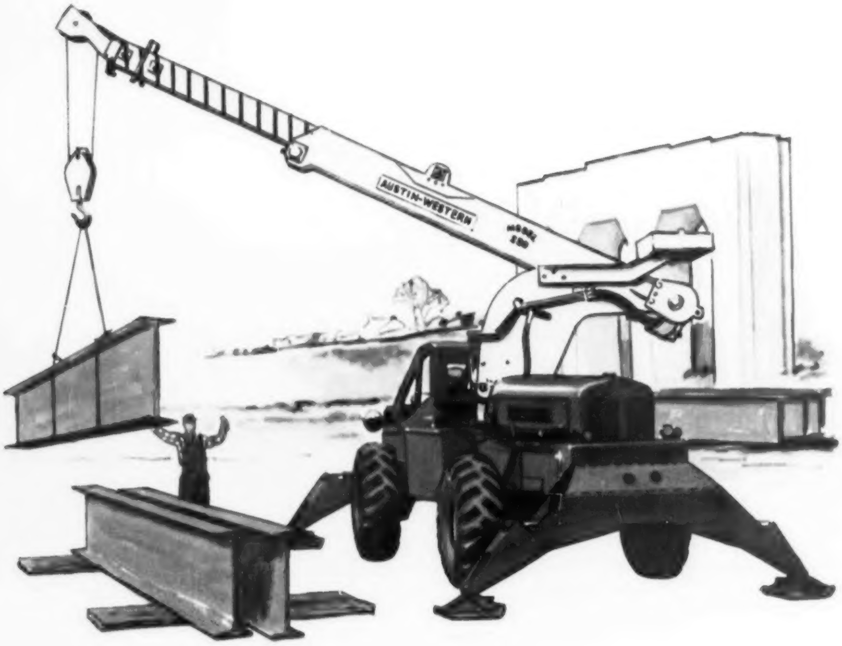
MODEL 210



7-ton range—This basic model of the hydraulic crane line is rubber mounted, self-propelled; capable of road speeds up to 35mph. A real workhorse for an astounding variety of lift, carry and place assignments. 18-foot telescoping boom rotates in continuous full circle, maximum 35-foot boom reach optional. All-wheel steering gives unlimited maneuverability in tightest spots; all-wheel drive means plenty of traction for loaded boom travel on any surface. Low overhead clearance. Operation is fully hydraulic, including outriggers.

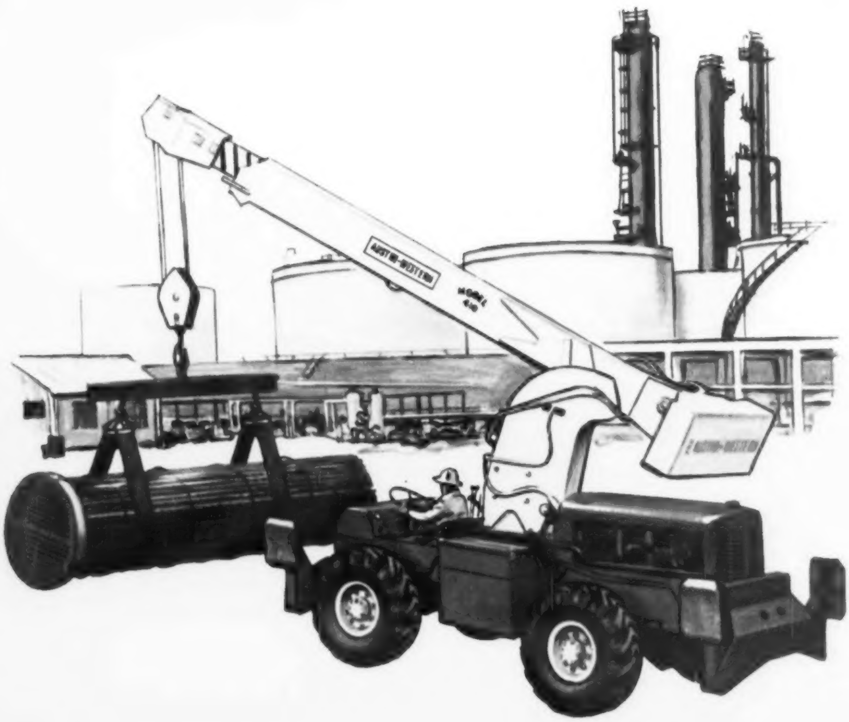
live hydraulic boom safety, flexibility

- ***Extends and retracts***
- ***Raises and lowers***
- ***Reaches up and in***
- ***Reaches out and over***
- ***Full hydraulic control***
- ***Two or more movements with full boom load***
- ***Continuous full circle rotation on most models***



MODEL 220

8-ton range—The Model 220 is a modified version of the basic Model 210. Its counterweighted boom as well as heavier structural design give it added lifting capacity into the 8-ton range. Like the 210, it features an 18-ft. telescoping boom, with maximum 35-ft. boom reach optional; continuous full circle swing; all-wheel drive and all-wheel steering. Full hydraulic controls mean tops in precision, safety, ease of operation.



MODEL 410

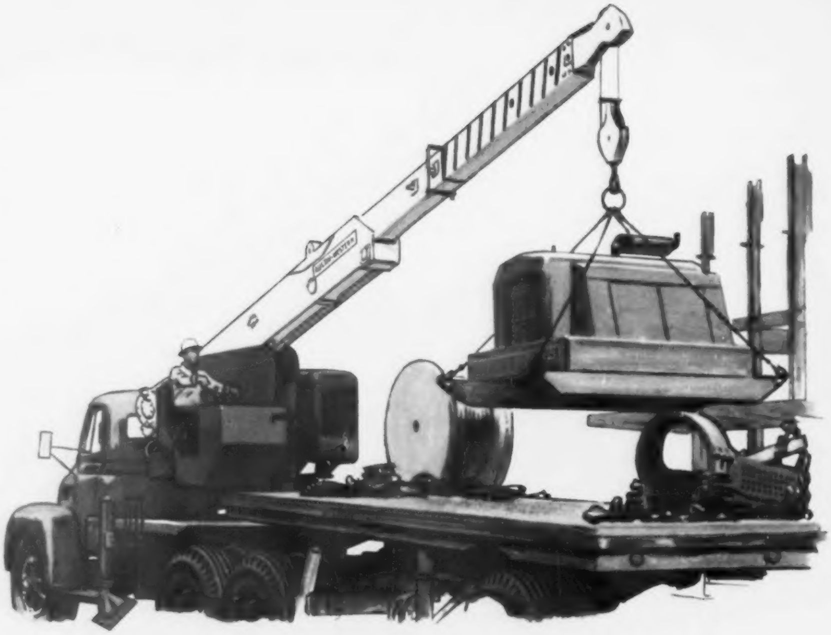
11-ton range — This big brute, the Model 410, is the heavy-duty unit in the A-W crane line. Like the 210 and 220, it is self-propelled; 25-ft. telescoping boom rotates in continuous full circle with maximum 48-ft. boom reach optional; raises to a 60° angle from horizontal.

Gas or diesel power; all-wheel drive and all-wheel steer are available. Travels from job to job at road speeds to 30 mph. This rugged, mobile crane is the rig for you if you need big crane capacity without sacrificing the profitable advantages of flexibility, versatility and mobility inherent in all models of Austin-Western hydraulic cranes.

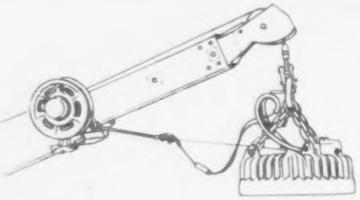
MODEL
210-P

FOR TRUCK OR STATIONARY MOUNTING

7-ton range—The Model 210-P is the famous Austin-Western live 210 hydraulic boom . . . available as a package unit for truck or stationary mounting. Its 18-ft. telescoping boom rotates in a continuous circle; maximum 35-foot boom reach optional; lift capacity is in the 7-ton range. Can't be beat for crane applications requiring a high degree of mobility. This unit, like all other A-W cranes, can be equipped with a wide variety of attachments for extra versatility—such as clamshell, orange peel, maintenance platform, etc.

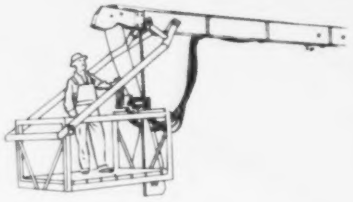


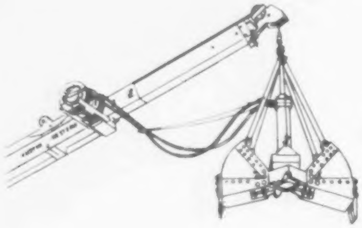
FOR GREATER VERSATILITY—A WIDE CHOICE OF OPTIONAL ATTACHMENTS AND EQUIPMENT



MAGNET

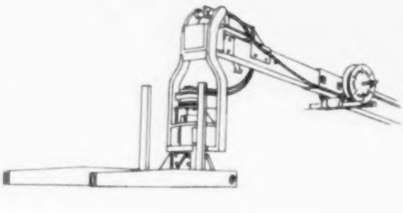
REMOTE
CONTROL
MAINTENANCE
PLATFORM





CLAMSHELL
BUCKET

LIFT FORK



Also available for most models:
- ***Orange Peel Bucket***
- ***Cab***
- ***Snow Plow***
- ***Rail Guide Wheels***
- ***Hydraulic Outriggers***
- ***Power Take-Off***
- ***Load Carrying Platform***
- ***Winch***
- ***Bulldozer Blade***
- ***Manual Boom Extensions***
- ***Pintle Hook***

Learn the facts today about the A-W crane best suited to profitably perform your lift, carry or place requirements!

Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.
BALDWIN · LIMA · HAMILTON
Power graders • Motor sweepers • Road rollers • Hydraulic cranes

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TAPPING

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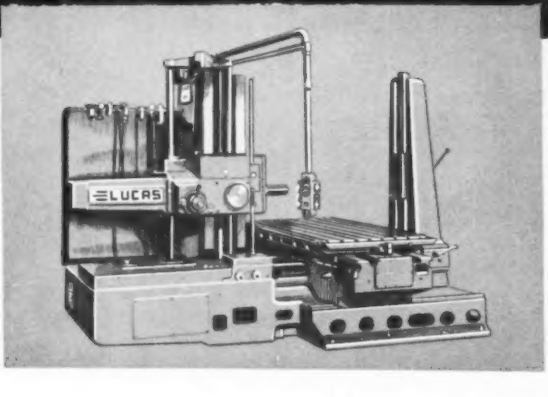

Automatic power positioning with Lucas precision

For production or faster completion of a single piece: locates head and table to predetermined settings for boring operations. No time wasted on jigs or fixtures in drilling, reaming and tapping. Lucas versatility, precision and time saving are the keys to Lucas profitability. Lucas Machine Division, The New Britain Machine Company, Cleveland, Ohio.

LUCAS
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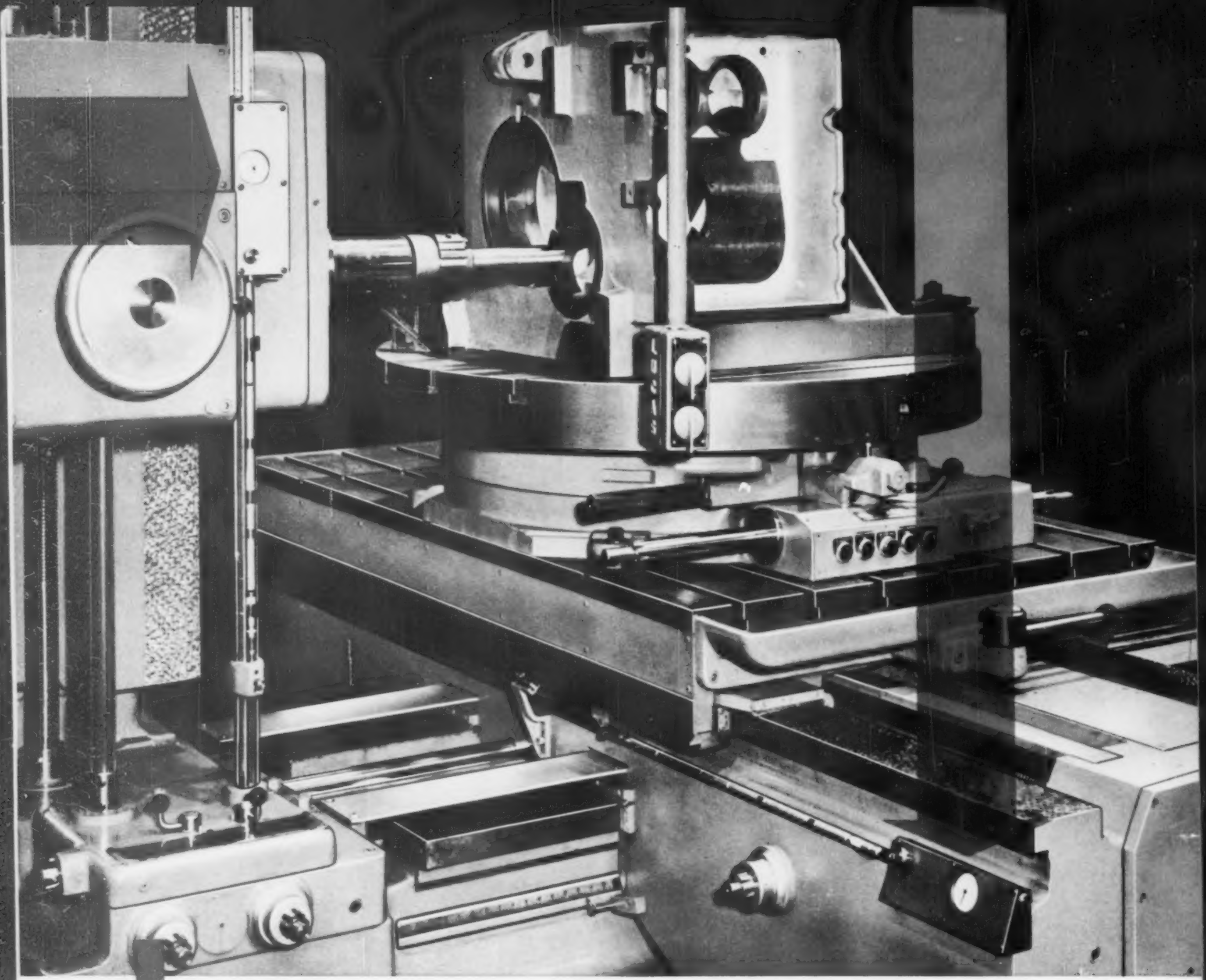
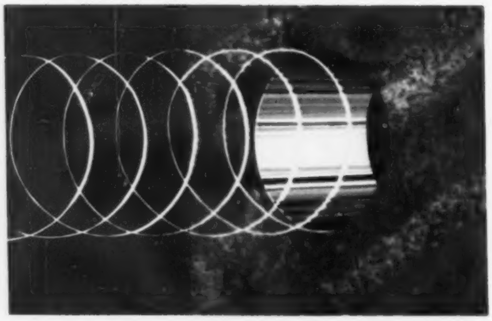


Automatic repeat settings accurate to ± .0001



Lucas Automatic Power Positioning operates at rapid traverse to locate head and table, entirely independent of operating feed rates—thru a system of end measuring rods and micrometer dial indicators. Upon starting the positioning cycle the machine does the precision setting automatically. Would you like a complete Lucas Catalog? Lucas Machine Division, The New Britain Machine Company, Cleveland, Ohio.

LUCAS
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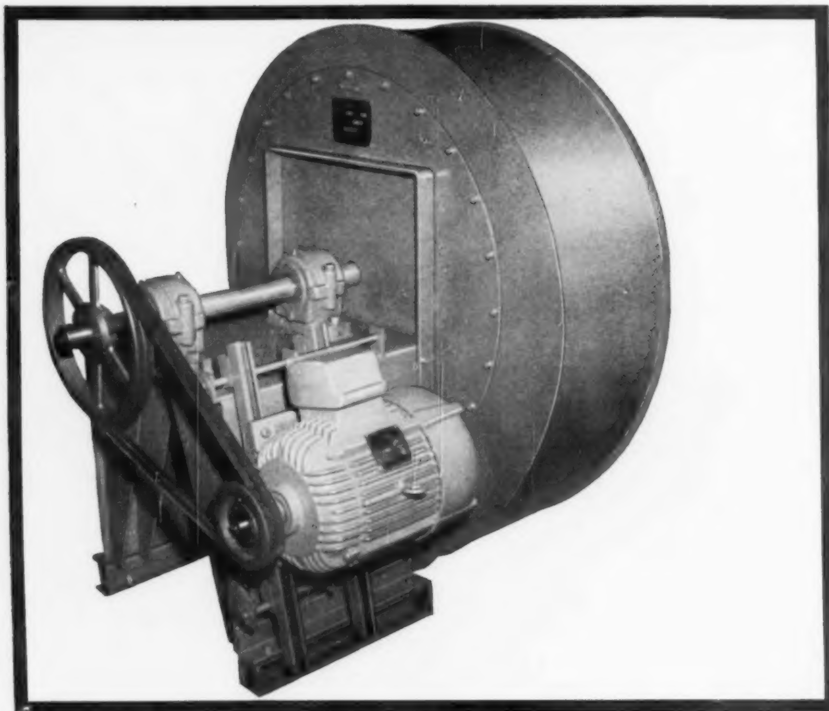
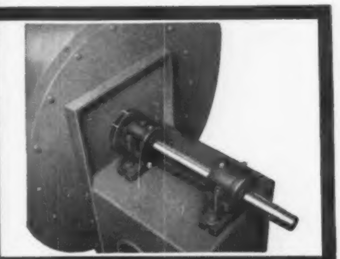


From Rugged Hot Gas Applications To Tough Materials Handling Jobs...



Upper: Heat Slinger for cooling shaft and bearings on a "Buffalo" Hot Gas Exhauster

Center: "Buffalo" Rubber-Lined Exhauster for corrosive fume handling.

Lower: "Buffalo" Type "MW" Material Wheel.

"BUFFALO" EXHAUSTERS CAN TAKE IT!

'Buffalo" Industrial Exhausters are ruggedly built, highly efficient heavy duty fans designed for a wide variety of applications. Husky steel plate housing is welded throughout. Adjustable to any discharge direction. Reversible for clockwise or counter-clockwise rotation. Available in numerous arrangements for many severe air and materials moving jobs. These include:

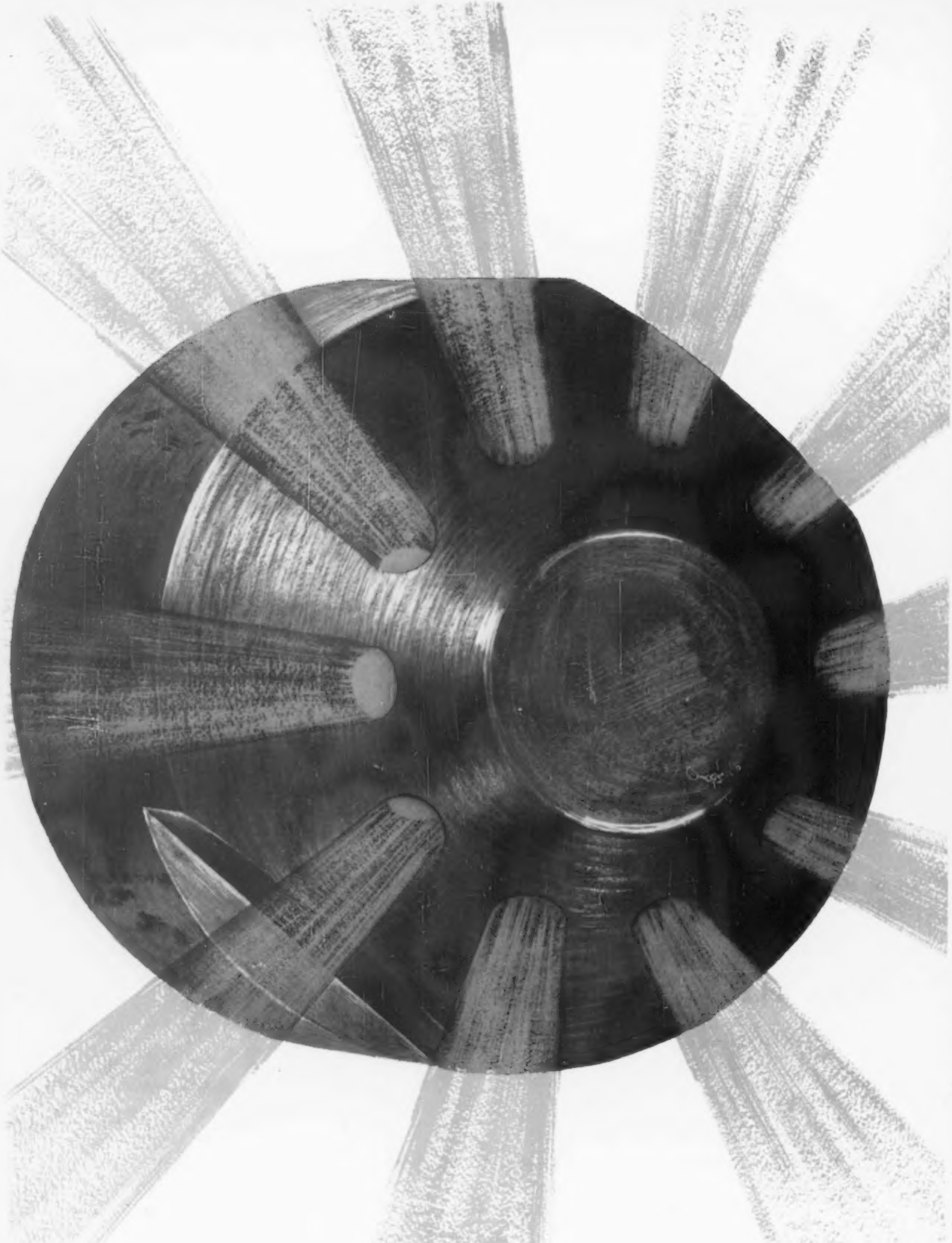
- **Moving Hot Gases** — 200° F. to 850° F. For this purpose units are equipped with heat slingers, high temperature ball bearings and/or separated steel bearing subbase.
- **Handling Corrosive Fumes.** Installations have proved that "Buffalo" Rubber-Lined Exhausters will outlast metal fans up to twelve to one. Rubber is vulcanized directly to all metal parts exposed to acid fumes.
- **Materials Moving.** Type "MW" material wheels are available for moving emery dust, saw dust, chips, long shavings and many other types of materials.

Investigate the advantages of "Buffalo" Industrial Exhausters for your severe air or materials moving jobs. Phone your "Buffalo" engineering representative, or write for Bulletin FI-110.

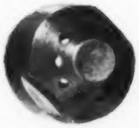
Buffalo

BUFFALO FORGE COMPANY
Buffalo, N. Y.
Buffalo Pumps Division • Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT
EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING



FOR THE MACHINERY PART THAT TAKES THE BEATING



Critically contoured holes in burner nozzles made of high alloy steel . . . distorted in two days. Mild steel corroded in two hours. But HASTELLOY alloy B nozzles now last several months . . . despite the punishing, high-velocity flow of steam-atomized fuel oils containing sulphuric acid, sulphur compounds, and other corrosive agents.

It's just one more example of why thousands of design and production engineers looking for tough metals for machinery parts . . . specify HAYNES alloys.

If design and production in your field demand really tough metal parts, look into HAYNES alloys. There are more than 15 to choose from, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. All parts can be furnished machined or ground to specified size and finish.

HAYNES Alloys *will do the job!*

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ALLOYS
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
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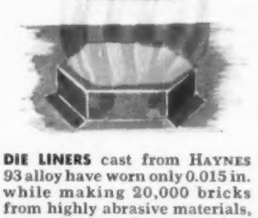
Address inquiries to Haynes Stellite Company, 420 Lexington Avenue, New York 17, N. Y.

The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

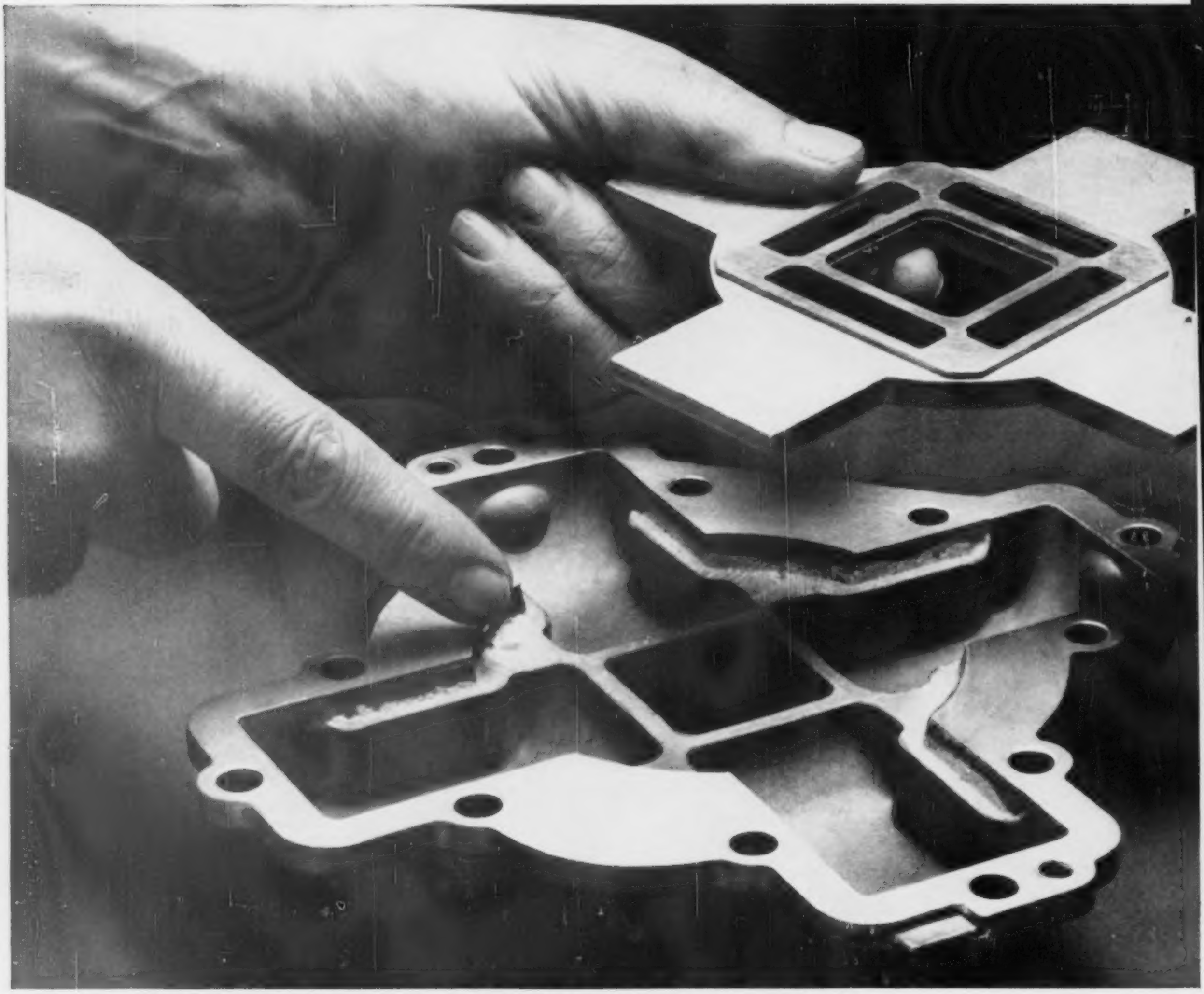
TYPICAL MACHINE PARTS OF ABRASION-RESISTANT "HAYNES" ALLOYS

MILK BOTTLE CAPPER sealing-segment fingers, investment cast of HAYNES STELLITE alloy No. 6, capped 100-million bottles in five years without noticeable wear.



DIE LINERS cast from HAYNES 93 alloy have worn only 0.015 in. while making 20,000 bricks from highly abrasive materials, far outlasting other metals.

HALF BUSHINGS made of HAYNES STELLITE alloy No. 6B are used as can headers of a machine that makes 300 milk cans a minute.



SEPARATE CASTINGS, bonded together in areas indicated, form complete complex casting shown on the right.

Cut rejects! Fabricate complex castings with

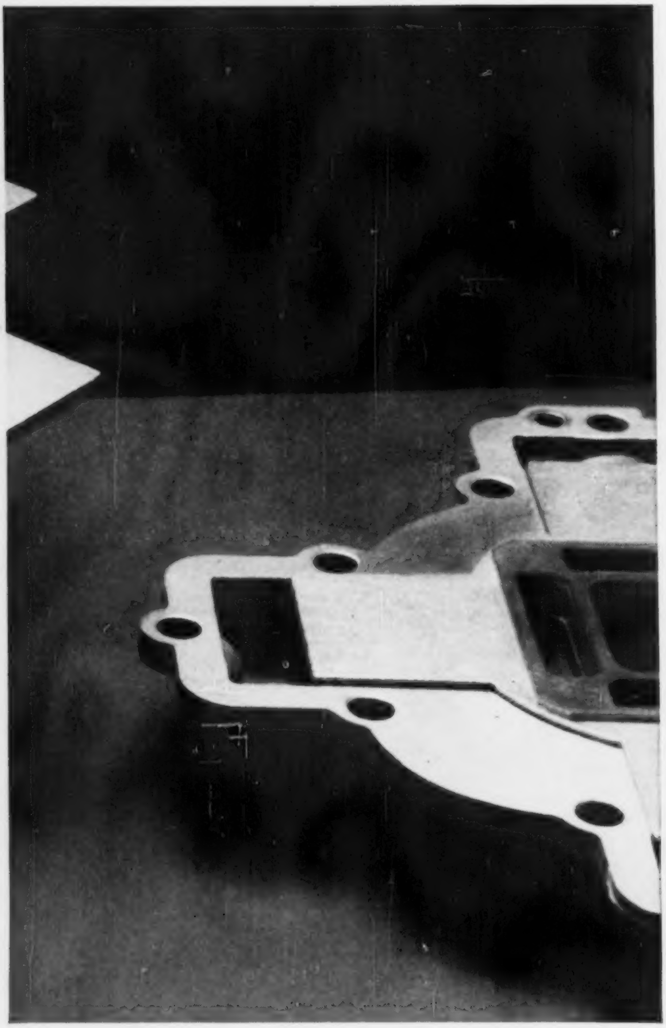
Now you can simplify production of hollow castings—and end costly rejects by casting them in sections, then bonding the sections together with high-strength SCOTCH-WELD Structural Adhesives, such as EC-1386!

By so doing, you eliminate the high rejection rate that often accompanies sand molding. You eliminate the costly machining and equipment required for mechanical fastening. You eliminate the wasteful, space-consuming bosses or flanges.

All you need is a flow gun and an oven. EC-1386 is a 100% non-volatile liquid and is solvent free. Thus, waste is negligible; no pre-drying is required before joining the sections. The adhesive bond can be cured to high ultimate strength quickly in an air-circulating oven (one to two minutes at 500°F. bond line temperature). And the cured bond can be machined for final touch-up operations. EC-1386 also serves to fill in voids, so that parts need not be held to close tolerances.

See how EC-1386 can help you cut costs, simplify and speed production and improve product quality. And learn how other 3M Adhesives are helping the metalworking industry. Contact your 3M Field Engineer. Or write: AC&S Division, 3M Company, Dept. SBQ-40, St. Paul 6, Minnesota.

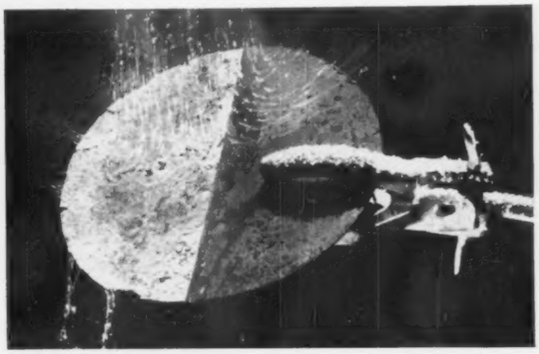
"SCOTCH-WELD" and "CORO-GARD" are Reg. T.M.'s of 3M Co.



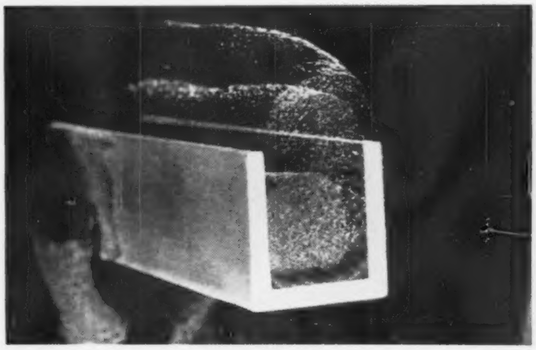
SCOTCH-WELD®

BRAND STRUCTURAL ADHESIVES

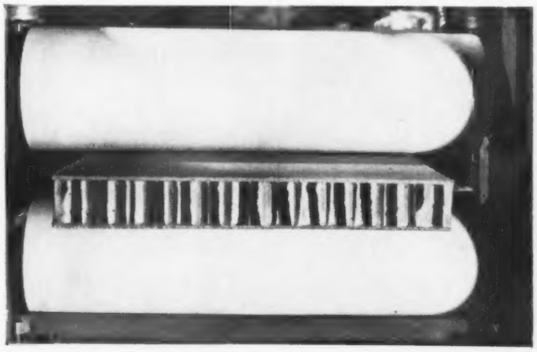
News about other 3M products



CORROSION RESISTANT COATING. CORO-GARD® 1706 Brand Protective Coating resists corrosive fluids and fumes, water and abrasion. It passed these torture tests: 2000-hour corrosive salt spray attack; 20-week submersion in 20% solution of hydrochloric acid; 6-month weather exposure in Miami, Florida. For steel, aluminum, wood, concrete, cloth, even some plastics.



SURE WAY TO SEAL. 3M Heat Expandable Sealers expand up to 125% under the normal heat of a paint-baking cycle, cure to a tough, flexible mass that keeps out dirt, water and weather, completely seal even the most irregular gap or seam. The unexpanded solid is also efficient as a gasket replacement sealer, flange sealer and for other sealing jobs.



COLD SANDWICH BONDING. 3M Adhesive EC-1357 makes it possible for you to bond sandwich panels with a nip roller or cold press. You need no clamps or heated presses to complete tough core-to-skin bonds that resist moisture and high and low temperatures. This one adhesive bonds a variety of materials quickly, economically. Its dark color absorbs infrared heat quickly, dries fast.

ADHESIVES, COATINGS AND SEALERS DIVISION

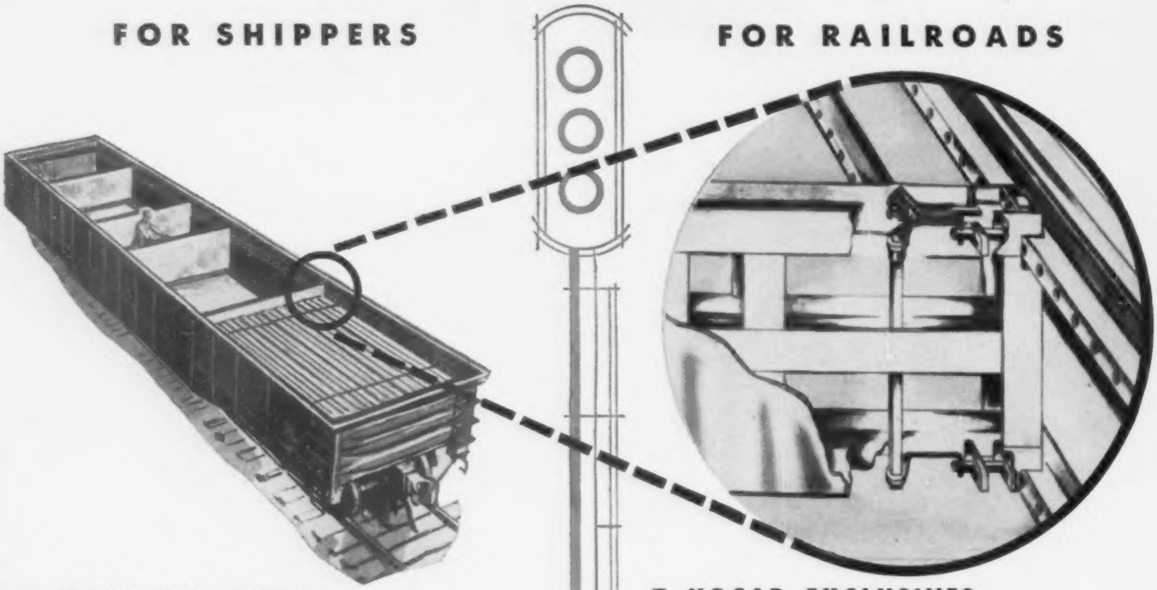
MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

How "RoLLoK" Movable Bulkheads Solve Shipping Problems . . .

FOR SHIPPERS **FOR RAILROADS**



COPPERWELD STEEL COMPANY,
WARREN, OHIO, MANUFACTURERS OF ARISTOLOY,
THE ARISTOCRAT OF ALLOY STEELS, REPORTS:

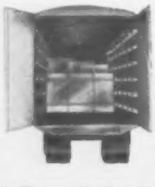
"Yocar movable bulkheads save us up to 1800 pounds of dunnage and 6 man-hours per car. They require a minimum of effort to position and lock for shipping. To date all loads have arrived without damage claim." Copperweld is just one of many shippers saving time and money with Yocar safe shipping devices.

No matter what **your** product or shipping problem, Yocar can help solve it. Give us a call.

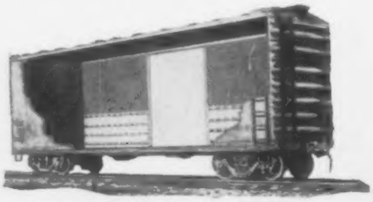
7 YOCAR EXCLUSIVES:

- "ZEE" TRACKS . . . Cut installation time in half over double angle construction.
- OVERSIZED CASE-HARDENED LOCKING PINS . . . Easy operating, allows for distortion of side walls.
- ROLLER SUSPENSION . . . Case-hardened rollers allow fast, effortless positioning.
- FOUR PER CAR SET . . . Meets AISI Traffic Committee's recommendation for 48" high car walls.
- POWERFULLY BOLSTERED . . . by five 6" "I" beams . . . built to last.
- PERFECT COMPANION . . . for Yocar 3-section roofs.
- TWO FACINGS available . . . no extra cost . . . choose ¼" steel or wood.

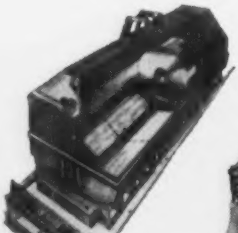
YOCAR MAKES A COMPLETE LINE OF DAMAGE CONTROL DEVICES



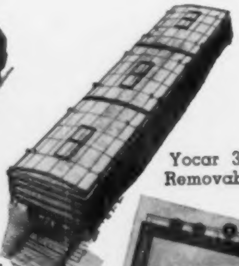
Safe-Cargo Anchor Rails for piggy-back trailers.



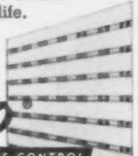
Yocar Safe-Cargo Econo-Guard —increases car wall life.



Shock-Spring Coil Skids and protective hood with seam-lock and corner strength.



Yocar 3-Section Removable Roofs.



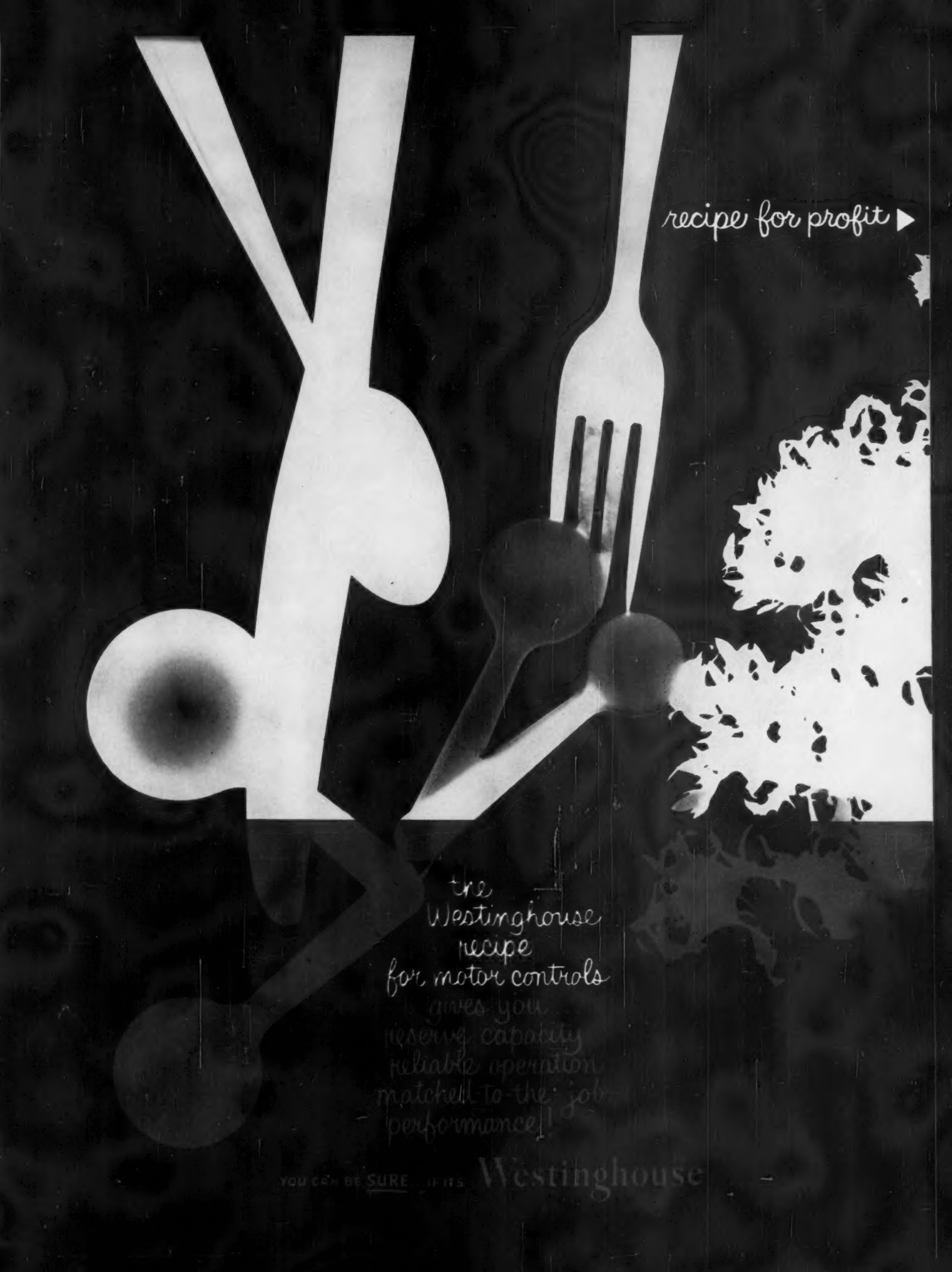
Send for new catalog today!

YOCAR

SAFE-CARGO

LOW-COST POSITIVE DAMAGE-CONTROL

YOUNGSTOWN STEEL CAR CORP.
NILES, OHIO


recipe for profit ▶
the Westinghouse recipe for motor controls
gives you reserve capacity reliable operation matched-to-the-job performance!
YOU CAN BE SURE... IF IT'S Westinghouse

TESTED RECIPES FOR PROFIT . . .

the blending of ingredients in Westinghouse controls meets today's demands for profitable production

Combine advanced design ability and modern manufacturing facilities . . . fold in select materials and quality components. Mix in years of research and experience. Spice as required with superior application and engineering assistance. Baste with outstanding quality control until mixture attains perfection. Garnish with nationwide repair facilities.

That's the Westinghouse control recipe. But just as a chef's deft touch is the final element needed to turn fine ingredients into an epicurean triumph, so a generous portion of Westinghouse experience and know-how blends superior control ingredients. Result: **more control value for your money** — reserve capacity to handle overloads . . . long, trouble-free service . . . and apparatus performance matched perfectly to your needs. Hidden qualities that distinguish Westinghouse controls . . . and your best insurance against costly down time.

Westinghouse makes a wide range of outstanding industrial motor controls. Ask your local Westinghouse representative to explain all their **hidden values** . . . benefits by the baker's dozen . . . for more profitable plant operations. He'll be glad to assist you in applying Westinghouse controls.

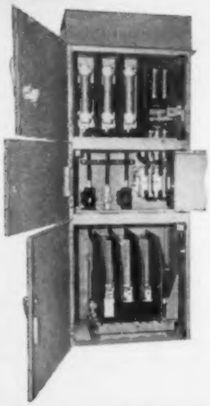
Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

YOU CAN BE SURE...IF IT'S Westinghouse

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

Just ask any gourmet. Good ingredients alone don't guarantee an epicure's delight. It takes years of experience to convert a basic recipe into a blue ribbon winner. So, too, with superior electrical products.

J-25003-2



Ampgard* High-Voltage Starters

Maximum protection for motors, systems and personnel.

Faults interrupted in less than ½ cycle . . . isolates fault to prevent shutdown of other equipment.

Completely front accessible.

Externally operated line isolating switch.

Exclusive mechanical and electrical interlock . . . prevents switch operation under load; automatically stops motor when cabinet is open.

Full line available . . . for squirrel-cage, wound-rotor and synchronous motors up to 3000 hp — up to 5000 volts.

* Trade-Mark

Reduced Voltage Starters

Widest possible selection of primary resistor, auto-transformer, part-winding and star-delta types for squirrel-cage, wound-rotor and synchronous motors in all hp ratings — up to 600 volts.

Manual and magnetic starters to provide the proper starting characteristics for any application.

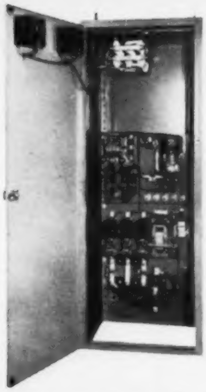
Available with integral circuit breaker or disconnect switch — fused or non-fused.

Enclosures available for every need . . .

general purpose . . . dust-tight industrial . . .

watertight . . . explosive atmospheres.

Available for immediate delivery.



Static Slipsyn® Synchronous Motor Control

Static transistor circuit guarantees . . . maximum reliability and accuracy; no moving parts to wear, corrode or fail; unaffected by contaminated atmosphere.

Motor field excitation applied at precise speed and pole position.

Adjustable pull-out protection, permits immediate detection or delays action to eliminate false tripping caused by transients.

Available as complete starter or field conversion unit for **any make** control!

Control Centers

Compact grouping of all motor controls

cuts installation time;

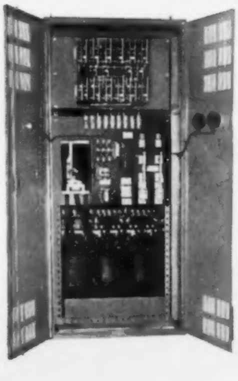
frees production areas;

permits easy one-man control supervision;

speeds maintenance and service.

Interchangeable modular construction.

DESIGN TESTED AND VERIFIED in the Westinghouse HIGH POWER LABORATORY



D-C Packaged Power Supplies

Ideal for cranes, elevators, magnetic chucks, etc.

"Packaged" units, including control, are ideal for "on-the-spot" conversion of a-c to d-c, eliminating long line voltage drops.

Lower first cost, lower installation cost than motor-generator set.

Require approximately 67% less floor space, weigh less than half of equivalent motor-generator set.

Completely static units — essentially maintenance-free.

Hermetically sealed silicon cells prevent contamination of the rectifier; no apparent aging assures years of trouble-free service.

J-25003-3

THIS IS DU PONT DELRIN®

a new engineering material offering the user distinct performance and cost advantages in many applications once reserved for metal

Today, in hundreds of products, "Delrin" acetal resin is being used where die-cast zinc and aluminum, cast and machined brass, stainless steel and cast iron were once considered "standard". For good reasons, too: in "Delrin", these products work better, cost less to make, or both. On the opposite page, you'll find three typical examples.

The performance advantages offered by "Delrin" are based on its unique combination of properties that frequently permits parts reductions through design of multi-function parts. "Delrin" has the stiffness to remain rigid in large sections, the tensile and flexural strength to withstand high-stress loadings, the dimensional stability to hold close tolerances and the frictional properties to operate usually without lubrication. And these properties are retained even under exposure to wide variations in temperature, humidity, solvents and stress.

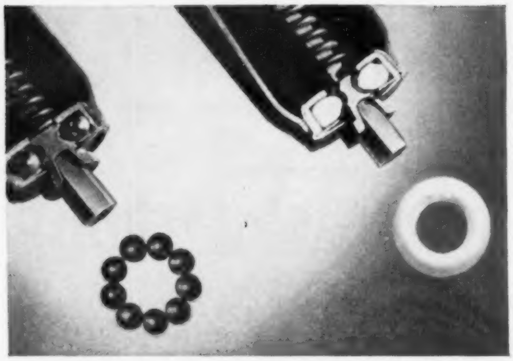
The cost advantages offered by "Delrin" stem primarily from its ease of fabrication, via injection molding or extrusion. These processes permit economical mass production. The need for finishing operations is usually eliminated. Part-to-part uniformity minimizes rejects. Assembly can be simplified by joining with mechanical fasteners, spin welding, snap or interference fits. "Delrin" is available in integral colors, and varied surface effects can be achieved by texturing, vacuum metalizing or painting.

We will welcome the opportunity to assist you in evaluating "Delrin" for your own product designs. A letter or the coupon at right will bring a prompt reply.

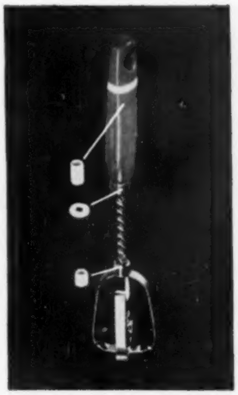
THIS IS WHAT DELRIN® IS DOING

Now that "Delrin" acetal resin is available commercially, a rapidly increasing number of applications are going into commercial production: gears, bearings, housings, valve parts, plumbing fixtures, sporting equipment, telephone components, household items, clothing fitments, and many others.

During the past three years, over 500 applications of "Delrin" were field-tested by some 250 manufacturing concerns. The success of these wide-ranging tests suggests that "Delrin" may well help you, too, improve a product, lower its costs, or develop new designs for your profit. Commercial processors, and our own staff of technologists will gladly provide you with more information.



A ring of "Delrin" replaces nine steel balls in the bearings for roller conveyors produced by the Rapids-Standard Co., Inc., Grand Rapids, Mich. These new bearings offer the advantage of quiet operation. Beyond initial lubrication, no further lubrication is required. "Delrin" was specified because of its low coefficient of friction, high strength, corrosion resistance and dimensional stability. Bearings of "Delrin" are also featured in Rapistan® wheel conveyors. (Molded by Sinko Mfg. and Tool Co., Chicago.)



This one-hand egg beater features three parts of "Delrin" that replace a stamped brass bearing, a cold-rolled steel retainer and a brass bushing. The excellent frictional qualities of "Delrin" provide smoother, quieter operation. Tough and abrasion-resistant, "Delrin" provides a life span ten times longer than originally anticipated according to the manufacturer, Ekco Products Company, Chicago, Ill. (Molded by Vulcanized Rubber and Plastics Co., Morrisville, Pa.)

Flat-top conveyor chains of "Delrin" made by Fenco, Inc., Chicago, weigh only one-third as much as steel chains. Their service life is estimated at two to four times that of metal conveyors. Initial cost is 40-50% lower and little maintenance is required. The flat links of "Delrin" are strong, resistant to abrasion and corrosion, have a low coefficient of friction, require no lubrication. (Molded by Du Bois Plastics Product Company, Buffalo, N. Y.)

POLYCHEMICALS DEPARTMENT

DU PONT

REG. U. S. PAT OFF

Better Things for Better Living . . . *through Chemistry*

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON

E. I. du Pont de Nemours & Co. (Inc.)
Department U-428, Rm. 2507D
Nemours Building, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use: ____________________

NAME ____________________

COMPANY ____________________ POSITION ____________________

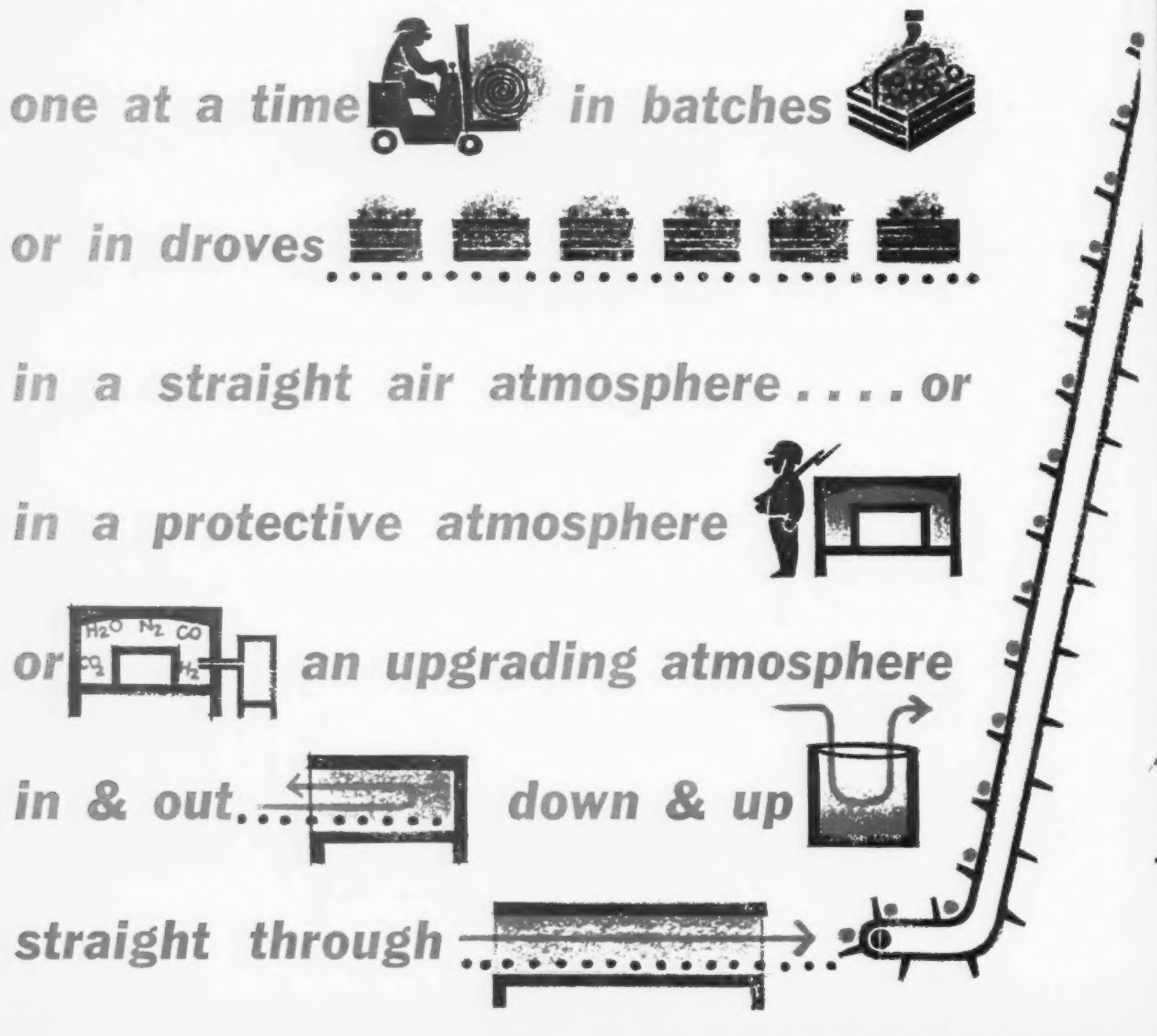
STREET ____________________

CITY ____________________ STATE ____________________

In Canada: Du Pont of Canada Ltd., P. O. Box 660, Montreal, Que.

***IF* you want to *HEAT* metal . . . .**

(melting, forging, brazing, sintering or treating) . . . . ferrous, nonferrous or exotic . . . . whether your parts travel



one at a time in batches

or in droves

in a straight air atmosphere . . . . or

in a protective atmosphere

or an upgrading atmosphere

in & out down & up

straight through

or in a combination

with manual operation

or automatic AND if you want

the economy of standard equipment

the least costly fuels . . .

PLUS known production rates and

pre-rated operating costs

WHAT DO YOU NEED? (pit, pot, box,

link, muffle, tube, snap or lab furnace)

. . . SURFACE MAKES IT!

Surface®

Write for Bulletin SC-175. Surface Combustion, 2373 Dorr St., Toledo 1, Ohio.
In Canada: Surface Industrial Furnaces Ltd., Toronto, Ontario.

A division of Midland-Ross Corporation M-R

INCREASE CAMPAIGN LIFE UP TO 18 MONTHS WITH **KAISER** BLAST FURNACE CASTABLE*

WHAT IS KAISER BLAST FURNACE CASTABLE? It is a dry-mix gunning material for the full range of blast furnace lining, including area below the tuyeres. The material is a hydraulic setting, high strength clay product made with a very pure calcium aluminate binder (low in iron to resist effect of CO disintegration, and high in strength to resist abrasive conditions).

WHEN SHOULD IT BE USED? Kaiser Blast Furnace Castable was developed specifically to provide a quick, economical and dependable means of prolonging furnace life without a major reline. Thus, it may be used when a furnace must be kept on the line to meet heavy production schedules, or it may be used to improve production economy by extending normal productive life of a furnace.

HOW FAST CAN THE MATERIAL BE PLACED? When down time is an important consideration, Kaiser Blast Furnace Castable can be gunned into place—around the clock—at a rate of up to 9000 pounds per hour per gunning unit. Service can be resumed in a fraction of the time needed for other methods of repair or rebuild! Curing is accomplished with normal heat-up procedure. (Actual down time varies, of course, with amount of surface preparation—cleaning slag, coke, limestone, etc. from the existing brickwork.)

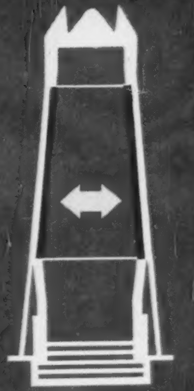
WHAT IS THE COST AS COMPARED TO BRICK? Cost of actual repairs made with Kaiser Blast Furnace Castable is only about one-fourth the cost of repairs made with brick. Even more important, cost- and profit-wise, is the additional iron production made possible by increased campaign life.

HAS KAISER BLAST FURNACE CASTABLE BEEN PROVED IN SERVICE? Yes. The three locations described at right show the range of installations now in service.

*Formerly MEX-R-CO BF Blast Furnace Castable.

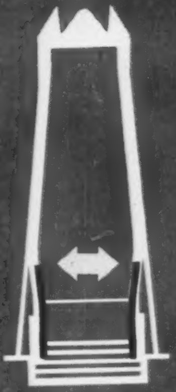
LOCATION NO. 1. 28-ft. diameter furnace, capacity 2000 N. T. per day, 287 tons Kaiser Blast Furnace Castable installed, starting at tuyeres and extending to wear plates. Thickness of material varies from 6 to 26 inches. Total installation time: 90 hours.

INCREASED CAMPAIGN LIFE: 15 months (and still in service).



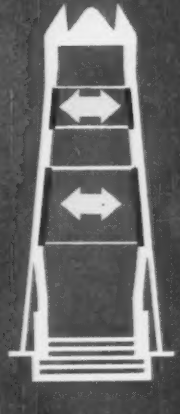
LOCATION NO. 2. 20-ft. diameter furnace, 65 tons Kaiser Blast Furnace Castable installed, beginning slightly below tuyeres and extending upward toward mantle. Thickness of material varies from 4½ to 13½ inches. Total installation time: 22 hours.

INCREASED CAMPAIGN LIFE: 12 months (and still in service).



LOCATION NO. 3. 28-ft. diameter furnace, capacity 1300 N. T. per day, 100 tons Kaiser Blast Furnace Castable installed: one section extending from mantle upwards 16 feet with average thickness of 16 inches; second section extending from wear plates downwards 10 feet, with average thickness of 7 inches. Total installation time: 29 hours.

INCREASED CAMPAIGN LIFE: 12 months.



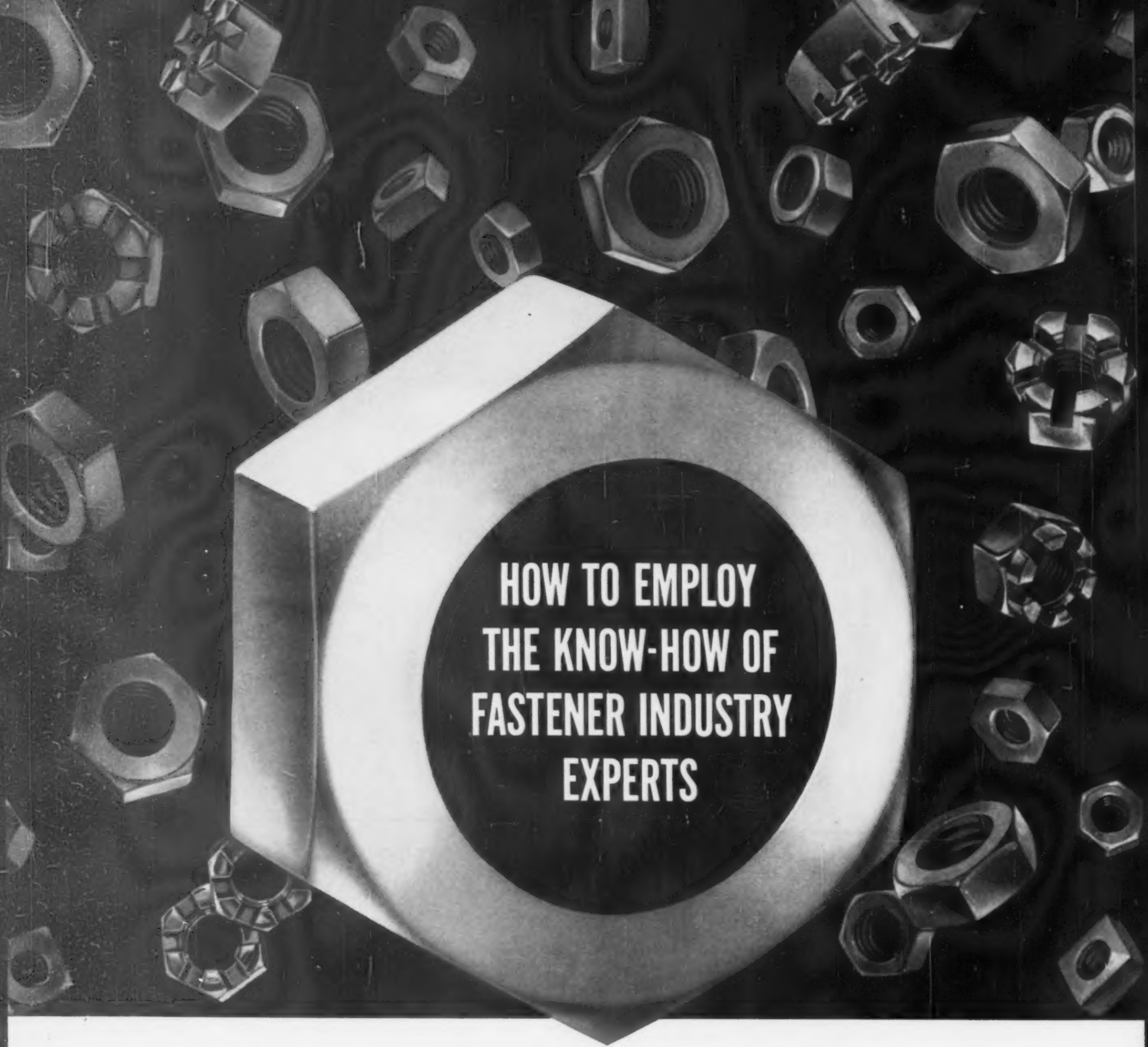
For full details on these installations—and to learn how you can achieve increased campaign life—contact your Kaiser Refractories sales representative.

Call or write Kaiser Refractories and Chemicals Division, Dept. SO121, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below.

PITTSBURGH 22, PA. . . . 3 Gateway Center
MEXICO, MISSOURI . . . . Mex-Rico Building
OAKLAND 12, CALIF. . . 300 Lakeside Drive

KAISER REFRACTORIES

MEXICO REFRACTORIES NOW MERGED WITH KAISER REFRACTORIES
MEX-R-CO High Alumina, Fire Clay and Silica Refractories
Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes



Your Republic Bolt and Nut Distributor Can Help You

A storehouse of information on new developments and trends in the fastener industry is yours for the asking, through your local Republic Bolt and Nut Distributor. He's the man to call for problem-solving ideas on handling fastening jobs—ideas that can mean better, more efficient fastening at lower cost.

Keeping up with what's new in the ever-changing fastener industry is a vital part of the service offered by your local distributor and his staff. In doing so, he's backed by the know-how of the experts at Republic Steel—a company whose fastener experience spans more than a century. This experience is at your command.

For labor-saving, product-improving ideas on fastening, and for prompt delivery of fasteners in any quantity, call your Republic Bolt and Nut Distributor, *today*. He's at your service.

Call your local distributor for quick deliveries of . . .

REPUBLIC Bolts and Nuts

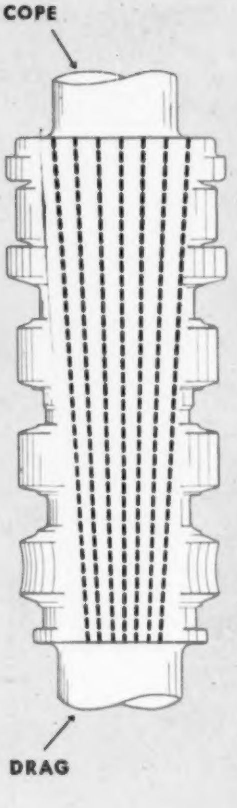
REPUBLIC STEEL ®

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

With rolls, it pays to know which end is "up"



Cast steel structural mill roll shows good pass location to promote proper directional solidification.

There's a very good reason why every roll shipped by Mack-Hemp carries the word "DRAG" engraved on one wabbler. With all cast rolls, maximum strength and depth of sound metal tend to occur toward the *drag* end of the roll—the end at the bottom of the mold when the roll is being poured. This is because of the normal manner in which the "lines of solidification" form as the molten metal cools and solidifies. Also the pressure from the weight of the metal above helps increase the density of the metal in the drag end of the roll.

As you can see from the diagram at the left, the solidification lines angle gently outward as they rise toward the top or "cope" neck of the roll, forming a cone-shaped pattern. In general, these lines of solidification mark the boundary of the dense, homogeneous metal. As a result, there is more good metal in and near the drag end than at the cope end. To assist the roll user in quickly identifying the "bottom" end of his rolls, Mack-Hemp brands the drag wabbler of every roll produced in its foundries.

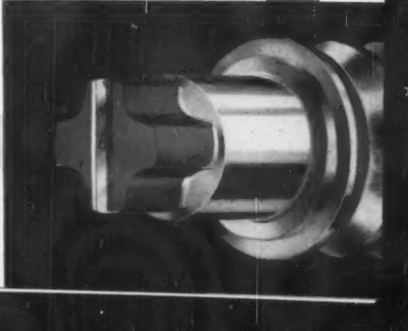
Locate the deepest passes in the DRAG end—Roll designers making drawings for blooming, rail and structural mill rolls should try to locate the deepest passes in the driven end of the roll, as illustrated. Directional solidification from drag to cope is then more easily accomplished and a sounder casting results.

We don't mean to imply that deep passes cannot be located at the cope end of the roll—in some instances, the overall mill layout, flow to the next mill, etc. may make it necessary to have the deepest pass in the cope end. When possible, however, this should be avoided since a deep pass in the cope end of the roll will restrict proper feeding of the lower portion of the roll.

Another factor—For maximum roll life, roll blueprints should call for the deepest passes at the driven end of the roll body. If you have a special reason why they must be located elsewhere, note it on the drawing; otherwise any roll maker worth his salt will ask you about it.

Another good rule to follow is to check with Mack-Hemp on any problem of roll selection or application. In a century and a quarter of making mill rolls, we have run across just about every conceivable situation involving the use of rolls. Our advice is yours for the asking. Feel free to telephone or write us at any time.

An important legend... for maximum roll life, the drag wabbler should be driven.



MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery

You Can Afford Borg-Warner Quality...

A
Borg-Warner
QUALITY-RATED
Crane

$3990.00

For a 3-ton, 34 ft. Span
(with 5′ overhang each end)
Underhung, Motor Driven
Industrial Service Crane

The ideal crane for your pre-engineered steel frame buildings.

Here's a crane that's tailor-made for the popular pre-engineered, steel frame building. Overhang at both ends of the bridge beam permits installation for maximum hook coverage with greatest height under the hook in this type of building. And, "Borg-Warner QUALITY-RATED" is your assurance of maximum performance, reliability and long life.

If you are planning a plant addition, a new plant or modernization of existing facilities, it will pay you to get complete information and costs on Borg-Warner QUALITY-RATED Cranes. There's a type and size to suit your needs.

QUALITY-RATED CHECK LIST

- √ Full 3-ton rating with ample reserve capacity.
- √ High carbon steel bridge girder.
- √ Heavy-duty two motor hoist.
- √ Heavy-duty forged steel truck wheels.
- √ All welded, jig assembled end trucks.
- √ Precision ball and roller bearings throughout.
- √ Channel outrigger with welded diagonal bracing.
- √ Totally enclosed crane and hoist duty motors.
- √ Patented removable axles.

A maximum value at $3990.00

Industrial CRANES

INGERSOLL PRODUCTS
B-W
BORG-WARNER

Design it better . . .
Make it better.

Find Your Nearest Distributor Under CRANES In The Yellow Pages

Distributors in all principal industrial cities.

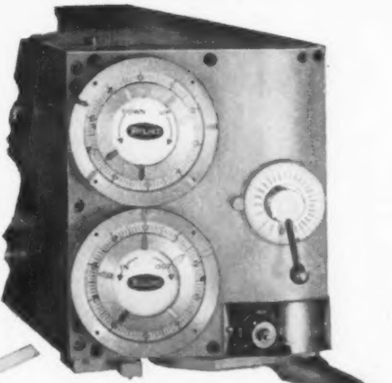
Borg-Warner® INDUSTRIAL CRANES
1510 S. PAULINA STREET, CHICAGO 8, ILLINOIS
Export Sales: Borg-Warner International, 36 South Wabash St., Chicago 3, Illinois

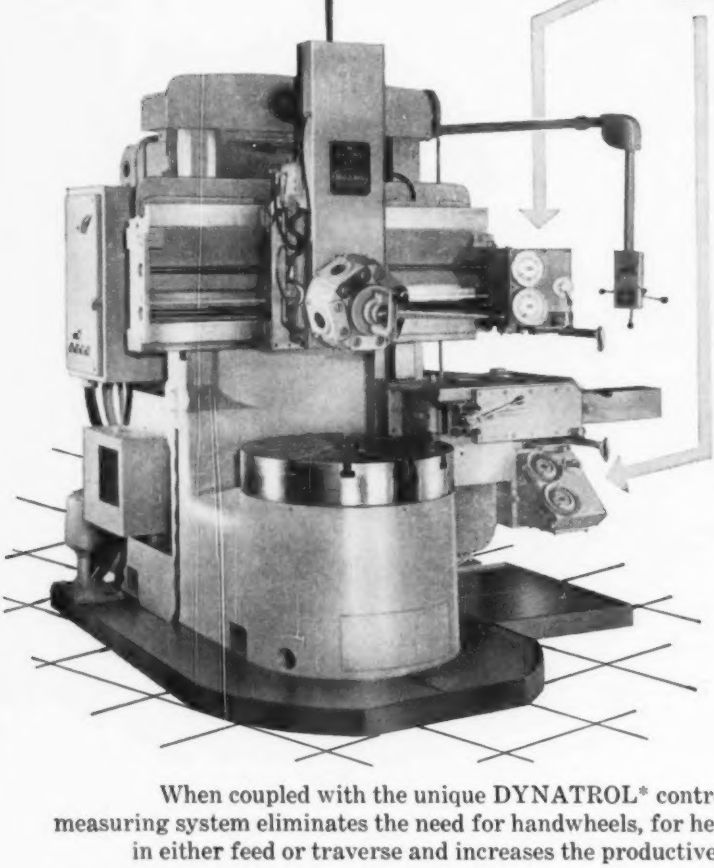
BULLARD

DYNATROL* V.T.L.

Obsoletes Handwheels

A completely new concept in measuring, utilizes large, easy to read, clock-type dials with dual pointers.





The operator sets the movable clips, around the dial, to conform with the workpiece requirements and by rotating the pointers to these settings he *knows* the tool is precisely located for the operation to be performed. The graduations and numerals remain stationary while the pointers rotate, one registering tenths of an inch and the other thousandths, for exact head positioning.

When coupled with the unique DYNATROL* control, this accurate measuring system eliminates the need for handwheels, for head-positioning, in either feed or traverse and increases the productive time of the machine.

* Trade Mark

Ask your Bullard Sales Representative about the many other features which make the Bullard DYNATROL* the *first* fully power-controlled vertical turret lathe.
THE BULLARD COMPANY, Bridgeport 9, Connecticut.

High-Spot Features of the DYNATROL* V.T.L.

Dynatrol V.T.L. is POWER CONTROLLED

By lever or pendant — it's your choice — head traverse rates can be varied from zero to nine feet per minute. Easy-to-read dials show exact position.

Feed selector gives infinitely variable feed rate without interrupting the cut.

Dynatrol V.T.L. is VERSATILE

Available equipment includes:

Bullard variable speed drive for infinitely variable table speeds throughout the full range with no loss of usable horsepower.

Fully automatic operation by Bullard Man-Au-Trol or point-to-point or continuous path numerical control systems.

Unique Size-Au-Trol* for accurate positioning of all heads. Contouring attachments: Hydraulic, electronic or electro-hydraulic. Four- or five-sided power-indexing turret heads. Thread cutting, drum scoring and angle turning attachment. Power-operated chucks.

Dynatrol V.T.L. is COMPACT

The new Bullard Dynatrol V.T.L. is compact in design, rigid in construction, lower in height, reduced in floor area.

Dynatrol V.T.L. is EASY TO MAINTAIN

Automatic lubrication throughout... fewer parts... fewer adjustments... easily accessible.

"YOU CAN'T BEAT A BULLARD"

CHILTON ANNOUNCES

MAP

MARKETING ASSISTANCE PROGRAM

NOW AVAILABLE . . .
MARKETING ASSISTANCE PROGRAM

Offering manufacturers counsel in marketing has long been a Chilton practice. But count on Chilton to move ahead with the times. Today Chilton's intensified activity in market research is a development that can help you get more out of your sales and advertising dollars. The stepped-up facilities—organized in depth and breadth—are identified as M-A-P, an efficient, penetrating Marketing Assistance Program.

If you are a manufacturer searching for new talents and tools in your marketing operations, Chilton can put a wealth of manpower and a multiplicity of facilities to work for you. All Chilton publications have marketing data representing years of selling experience and research in their respective fields. And Chilton's fully staffed Research Department is equipped to help you develop additional data to give even better direction to your marketing plans.

Chilton's standards of editorial excellence and quality-controlled circulation in 17 business publications are now linked with stronger and more complete marketing information for advertisers. Chilton representatives will be glad to give you more details.

Chilton COMPANY
Chestnut and 56th Streets
Philadelphia 39, Pennsylvania

Publisher of: Department Store Economist • The Iron Age • Hardware Age • The Spectator • Automotive Industries • Boot and Shoe Recorder • Gas
Commercial Car Journal • Butane-Propane News • Electronic Industries • Aircraft & Missiles • Optical Journal & Review of Optometry • Motor Age
Hardware World • Jewelers' Circular-Keystone • Distribution Age • Product Design & Development • Business, Technical and Educational Books

BOUND FOR SINGAPORE

"one-package" shipping to cut handling, protect cargo, increase payload

Truck-to-Ship—Lighter aluminum trailer-van container permits bigger payload, faster handling.

Truck-to-Rail—Aluminum containers are stronger, pound for pound, than steel, guard cargo better.

Truck-to-Plane—Smaller handling equipment, less labor, bigger payload, with aluminum.

The Finest Products
Made with Aluminum
are made with
REYNOLDS ALUMINUM

...or the town next door

Containerization is revolutionizing the movement of freight—and the best containers are made of rugged, lightweight Reynolds Aluminum.

Containerization is a new concept that is changing the whole character of transportation and shipping; it's a new concept that means lower shipping costs.

You put your bulk cargo in a box that could be as large as a truck-trailer, and send it, box and all, to its destination. The container is never opened, your products are never rehandled, no matter how many transporting methods or vehicles are used enroute.

Consider these savings: One sea-land shipping service estimates that its stevedores handle *500 tons* per gang hour with containerized cargo. Compare this to *25 tons* per hour for ordinary break-bulk cargo!

There are other advantages. No multiple handling. No need for ship-side warehousing. Faster accumulation of shiploads and trainloads, faster turn-arounds for carriers.

The shipper gets faster, lower-cost service, and his cargo gets better protection; there's less damage because there's less handling. Pilferage losses are completely eliminated.

No wonder containerization is revolutionizing the movement of freight!

The key to containerization is, of course, the "box" that holds the cargo. And when you consider the job the container must do, the savings it must achieve, it is not surprising that so many containers are made with Reynolds Aluminum.

Aluminum containers—whether they're trailer-van size, or fork-lift size—provide the ideal combination of strength and light weight. Pound for pound, aluminum is far stronger than steel, so an aluminum container will take a real beating, and protect its contents through the roughest handling.

Weighing one-third as much as steel, aluminum means easier handling, less labor, and smaller equipment for shipping companies, faster service for shippers. And, because aluminum resists corrosion and won't rust, containers last longer, maintenance is easier, and there's less chance of cargo contamination.

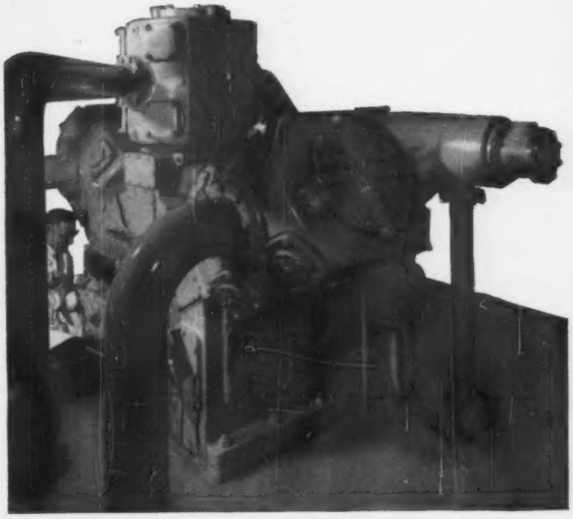
Reynolds does not make containers; it does supply aluminum and aluminum know-how to leading container manufacturers. For their names, write to *Reynolds Metals Company, P. O. Box 2346-JK, Richmond 18, Virginia.*

Watch Reynolds TV shows
"ALL STAR GOLF", "BOURBON STREET BEAT" and "ADVENTURES IN PARADISE"—ABC-TV

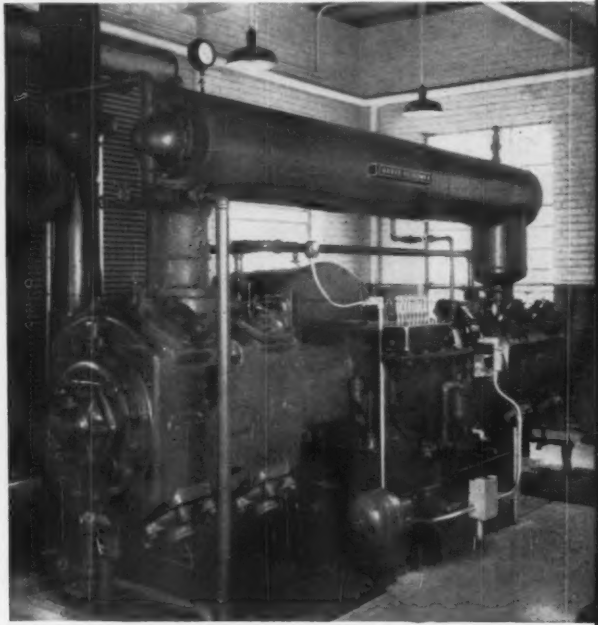
REYNOLDS ALUMINUM

George Edick, *Domestic Sales Manager, The Cooper-Bessemer Corporation, and* Floyd Paschke, *Sales Manager, The Rotor Tool Company, explain...*

HOW TO BOOST YOUR PRODUCTIVITY WITH COMPRESSED AIR



Installing a Cooper-Bessemer DMR-3 Air Compressor for foundry service. Capacity is 1670 cfm at 110 psig discharge. Other units available for service down to 572 cfm.



Cooper-Bessemer Model EM Air Compressor in a metalworking plant. Rated 1125 cfm at 110 psig discharge. Other models in ratings up to 10,000 hp.

The thing that counts in getting top output with air tools is *air pressure at the tool, under load.* Is this productivity what it should be in *your* plant? Here is a service that helps you find out *for sure* . . .

The teaming up of application service engineering of Cooper-Bessemer and its new subsidiary, Rotor Tool, provides full-scope experience to help you analyze your compressed air needs and plan your facilities for optimum production efficiency. This experience encompasses the study of compressor capacity requirements, number of compressors and their location for greatest economy, regulation of the plant, the distribution system and portable air tools. This service is yours without obligation.

It will pay you to call in the nearby application engineer of Cooper-Bessemer or Rotor Tool to help you make sure that you are getting maximum productivity with compressed air.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa New Orleans • Shreveport • Houston • Greggton • Dallas • Odessa • Pampa Casper • Seattle • San Francisco • Los Angeles

SUBSIDIARIES: Cooper-Bessemer of Canada, Ltd. . . . Edmonton Calgary • Toronto • Halifax • Stratford
C-B Southern, Inc. . . . Houston
Cooper-Bessemer International Corp. . . . New York • Caracas • Anaco
Cooper-Bessemer, S.A. . . . Chur, Switzerland • The Hague, Netherlands Mexico City
The Rotor Tool Company . . . Cleveland

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS • DIESEL • GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL,
ENGINE, TURBINE OR MOTOR DRIVEN

integrated CRUCIBLE steel service

Average Crucible warehouse stocks these and many other specialty steel items in a tremendous range of sizes and analyses. A single phone call will bring any or all of them to you *in the quantity you need.*

keeps 16,000 specialty steel items flowing from mills to local warehouses for immediate delivery to you

Every day, thousands of specialty steel items flow from Crucible mills to Crucible's 32 strategically located warehouses—keeping local stocks at levels that meet customers' *maximum* needs.

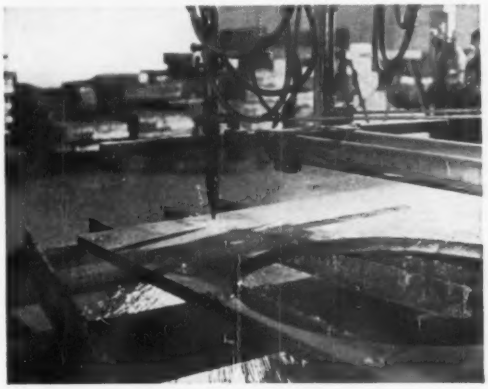
Here's how these continually-replenished stocks are helping one steel buyer today. He says:

"We reduced plant inventory to cut operating costs and free working capital and space. This is smart business. But it creates problems, too—like when production requisitions and extra-large order of 36" x 120" Type 304 stainless sheet, 20 ga and 2B finish—*and needs it overnight.* I solve this problem by calling the Crucible warehouse. It's set up to give us the kinds of steels we need from stock."

All 32 Crucible warehouses offer in-stock delivery of approximately 16,000 specialty steel items, ranging from tool steels to stainless sheet and wire. They're able to maintain these high inventories because they're part of Crucible's completely integrated operation, from mining the ore to steelmaking to warehouse delivery to you. If you'd like to know all the ways these warehouses can serve you, phone or visit the one near you today. *Crucible Steel Company of America, Dept. PD06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Inventory specialists keep warehouse stock records up-to-date to give you fast, accurate answers on availability of every analysis.

Steels you ordered yesterday arrive today at your receiving platform — dependably on schedule.



Warehouses maintain modern equipment, like this electronically-controlled flame cutter, for fast processing of specialty items.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS — Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS — Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS — Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS—Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS—Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS—Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

—and many others

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Caldwell, N. J. • Charlotte • Chicago • Cincinnati • Cleveland Columbus • Dallas • Dayton • Denver • Detroit • Erie, Pa. • Grand Rapids • Houston • Indianapolis • Los Angeles • Miami • Milwaukee Minneapolis • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City San Francisco • Seattle • Springfield, Mass. • St. Louis • E. Syracuse • Tampa • Toledo • Tulsa

WHO FORGES THE TOUGH ONES?...
and bores and machines them, too?

National Forge bored and machined these flanged tubes with such thin walls that the weight of a person's hand could change their dimensions. Yet throughout our machining, accurate close tolerances were maintained. An unusual machining job? A tough one? Yes . . . but not for National Forge—where we've been forging and machining such tough ones for 40 years.

When your job requires the skills of real "specialists," call on National Forge. Get experienced handling of the complete job—from basic steel to finished product.

NF
NATIONAL FORGE COMPANY
IRVINE, WARREN COUNTY, PENNSYLVANIA

For more information on "the tough ones," and the machinery that makes them "best" write for bulletin NF-59-03

POSITIVE DUPLICATION—EVERY TIME!

With these three metronomes—or with a thousand—the time interval you choose can be positively duplicated time after time after time. And with these three PD° surface wheels—as with *all* CINCINNATI PD GRINDING WHEELS—you'll get the same kind of Positive Duplication *every time*!

HERE'S WHY . . . IN 36 STEPS

There are 36 unvarying quality control steps in Cincinnati's unique PD manufacturing process. Right from the start with the choice of the "grains" that go into a wheel, PD procedures involve exacting checks and re-checks. Every grain characteristic—from size, cleanliness, absence of foreign matter, color, magnetic content, to bulk density before and after blending—must fully satisfy extraordinary PD specifications, which are followed throughout in all 36 rigid controls.

RESULT: PREDICTABLE PERFORMANCE

You can depend on the uniformity of PD WHEELS—for each reorder wheel gives you exactly the same good job as the original. Production goes up and stays up. Costs go down and stay down. This is the promise—and performance—of Positive Duplication.

CALL CINCINNATI TODAY

Solve your grinding problems with the help of our Cincinnati-trained specialists. Their wide experience in job set-ups and grinding operations is at your service. Just call your CINCINNATI PD GRINDING WHEEL Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

PD POSITIVE DUPLICATION

CINCINNATI°
GRINDING WHEELS

°Trade Mark Reg. U. S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

When predictable performance is imperative . . .

COPPER TUBE

HUSSEY COPPER AND BRASS TUBING & PIPE

Copper All Purpose Tube

Copper Water Tube (Types K, L, M)

Copper Refrigeration Tube (Dehydrated and Sealed Ends)

Copper Pipe

Brass Tube (also square, rectangular, hexagon)

Red Brass Pipe

There is no substitute for a material with proven service characteristics. Consider these unique advantages of COPPER TUBE: *conductivity* . . . highest heat transfer of all commercial metals; *durability* . . . unequalled corrosion resistance, even in underground installations; *flexibility* . . . forms readily to any design, regardless of complexity.

Hussey Copper Tube is available in a full range of sizes, tempers and wall thicknesses—all quality controlled to meet your most critical needs.

MADE IN U.S.A.
TO THE STANDARDS
OF AMERICAN INDUSTRY
★★★★★★★

COPPER
HUSSEY
BRASS

C. G. HUSSEY & COMPANY
Division of Copper Range Co.

Rolling Mills and General Offices
PITTSBURGH 19, PENNSYLVANIA

7 Convenient Warehouses

PITTSBURGH CLEVELAND NEW YORK CHICAGO
ST. LOUIS PHILADELPHIA CINCINNATI

PRECISION is the watchword during every step in the manufacture of Blaw-Knox Rolls. This extra care at every step, maintained by constant close inspection, is your assurance of rolls having the exact properties, dimensions, and finish for maximum service in the stand.

Our rollmakers have more than a century of close association with the metal rolling industry in the development and manufacture of rolls to meet the most rigid service requirements.

Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting rolls of the proper grade and design for your operations.

Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX
ROLLS

Manhour costs cut 51% by Budgit® Electric Hoist

Push Button Budgit Electric Hoist. Portable. For regular hoisting service where lifting speed and positive braking action are essential to keep production on the move. A 1-ton load can be lifted at 17 F.P.M. Two fully enclosed automatic brakes assure safe load control as well as accurate spotting action. Compartmented components reduce maintenance needs to the utmost in simplicity. Hook suspension. 110-220-440-550 volts AC. Only 24 volts at the push buttons on the higher voltage models for extra safety. Capacities: ⅛ to 2 tons.

Pull Cord Budgit Electric Hoist. Portable. Ideal for intermittent service. Has efficient gearing and two brakes. Provides fast lifting and one-hand operation. Available for AC, DC, and 12-volt battery operation, the latter models for truck or other use where regular electric power is unavailable. Hook suspension. Capacities: ⅛ to 2 tons.

60 A-2

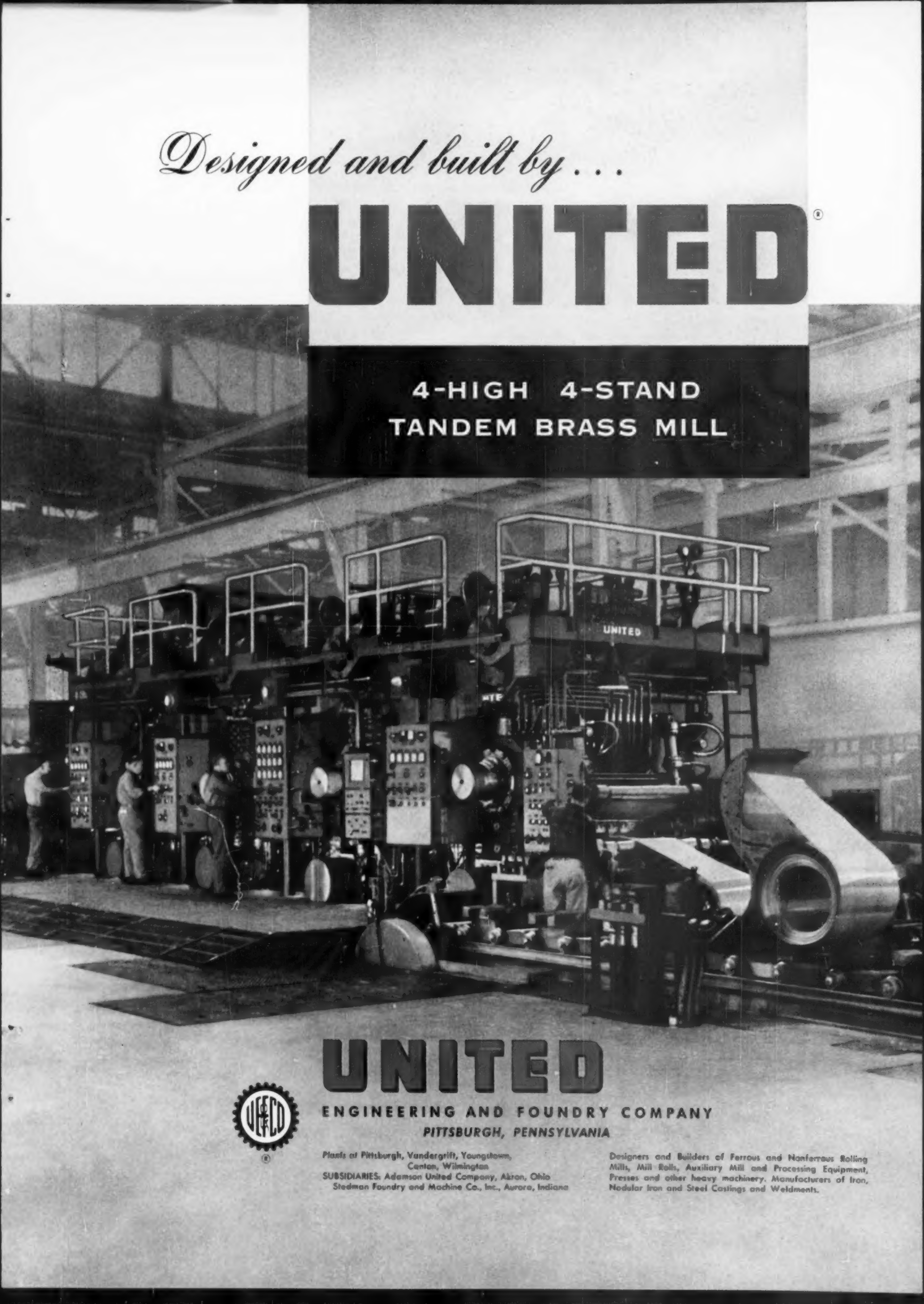
At Kent Products, Inc., Grand Haven, Michigan, high speed presses turn out small automotive stampings in big quantities, so scrap metal removal is a constant task.

One man using a 1-ton Push Button Budgit Electric Hoist on a push-type crane does the job easily and safely. He first attaches two grabs to a scrap-filled drum. Using one hand to "thumb" the push button, the operator hoists the load. His other hand guides the drum into the trailer truck. Spotting is accurate, even in piling the drums two-high.

The old method required a fork truck and driver, plus two other men to handle the drums in the trailer. Frank W. Behm, Plant Manager, reports that the new way paid for hoist, crane assembly and accessories in a few months.

Compare the new P:B Budgit Hoist with any other electric hoist in its class. It's a portable hoist you can hang up, plug in, and use immediately with top efficiency, safety, convenience and economy. Write for Bulletin 15010-15C or ask your nearby Shaw-Box Distributor for a demonstration.

BUDGIT ELECTRIC HOISTS
A product of
MANNING, MAXWELL & MOORE, INC.
Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario



Designed and built by . . .

UNITED®

4-HIGH 4-STAND
TANDEM BRASS MILL

UNITED

ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown,
Canton, Wilmington
SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Your new plant or expansion idea

Raw materials available?

Right process chosen?

Location correct?

Capacity adequate?

Economically sound?

Readily financed?

Kaiser Engineers designs and builds major facilities for the Steel industry, and is U. S. licensor for the proven L-D Process of oxygen steel making.

Among KE's most valued services are sound, searching economic analyses, feasibility studies and site evaluations. In a word—*Pre-Engineering*—impartial, outside analysis which helps you decide whether to proceed with, defer, or modify the project.

Kaiser Engineers offers you cost-saving, time-saving, one-company service from concept through start-up.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5488-5

Really Tough Where the Power Hits the Ground— thanks to TOCCO* Induction Heating

The Eimco Corporation of Salt Lake City manufactures heavy-duty earth moving and mining equipment of many kinds. All of their equipment must be engineered for tough work in the roughest kind of terrain, and all of it runs on tractor track that must stand up to the toughest abuse.

Superior Quality

Recently Eimco installed a 100 kw, 10,000 cycle TOCCO machine for heat treating track links. This equipment assures a completely uniform hardness pattern—the same every time for one link or one million. Furthermore, the parts are drawn as well as hardened by one TOCCO machine with one operator.

Increased Production

In addition to superior quality, TOCCO increased track link production over 400%. Formerly, one man could produce 35 links per hour; now, with TOCCO, he produces 150!

Whether you're looking for product improvement, increased production, or lower unit costs, it will pay you to investigate TOCCO Induction Heating.

JUST PUSH A BUTTON

TOCCO

*Trade Mark Reg. U.S. Pat. Off.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-4, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name______________________________

Position____________________________

Company___________________________

Address____________________________

City_________________ Zone____ State________

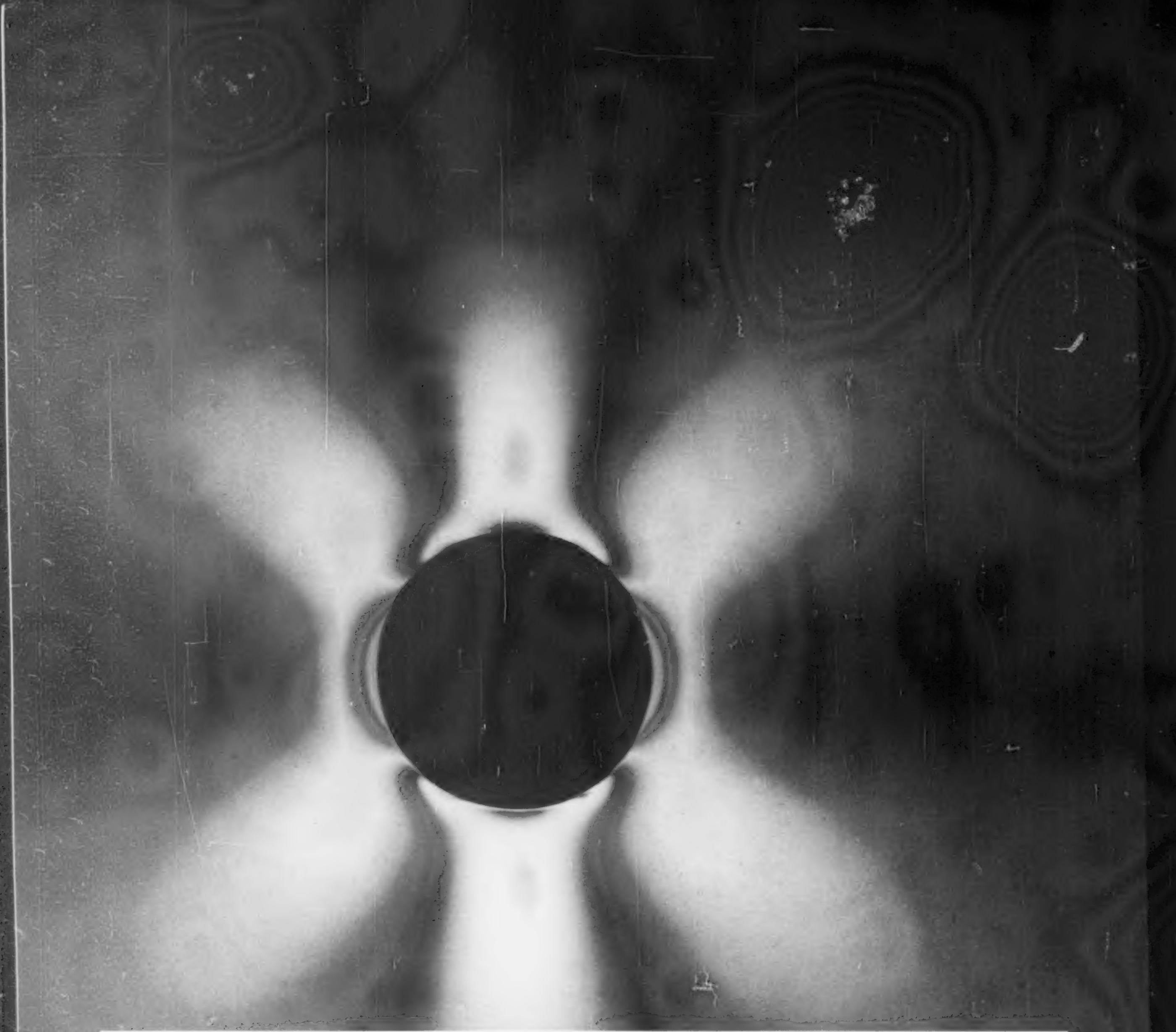


Photo-elastic stress patterns produced by models photographed with polarized light are one of the modern analytic tools available for ever-increasing perfection of Malleable iron castings.

For Greatest Strength Per Dollar . . . Use Malleable

To improve quality and cut costs, you'll find nothing better than Malleable iron castings. They provide more strength per dollar than any other metal, ferrous or non-ferrous! With Malleable you also get proven toughness, uniform quality and unsurpassed machinability.

See for yourself how much Malleable castings will improve your products and cut your costs. Send drawings or an outline of your requirements to a nearby Malleable castings producer who displays this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

For detailed information on "Strength Characteristics of Malleable Iron Castings", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

"Value Analysis" Proves–
Malleable Castings Improve Quality, Reduce Costs

When "Value Analysis" is your task, consider these outstanding advantages of Malleable iron castings: more strength per dollar than any other metal, ferrous or non-ferrous; exceptional machinability; metal exactly and only where it is needed; job-proven toughness.

Switch to Malleable Saves 47% on Railroad Car Thrust Collar

One of countless examples of cost reduction obtained by changing from other materials or processes to Malleable castings is this thrust collar used on railroad maintenance cars. While the steel part formerly used performed satisfactorily, it cost 99¢ before machining.

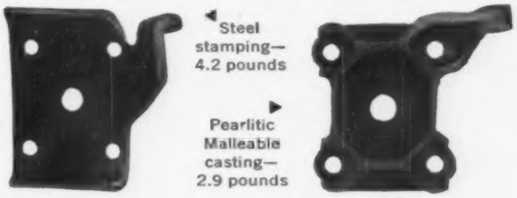
The cost of the standard Malleable casting before machining is only 51.7¢ — a saving of 47.3¢! Added to this, four machining operations — drilling of bolt hole, spot facing for bolt head and nut, milling the sleeve slot and sawing the transverse slot — were eliminated by switching to a casting. All remaining machining operations are improved due to Malleable's exceptional machinability.

Former part before machining (99¢)

Malleable casting before machining (51.7¢)

Cost Cut 15% on Spring Bracket by Using Malleable Producer's Engineering Services

This automotive rear spring bracket was originally a steel stamping, S. A. E. 1015, .438 stock, designed to withstand 800 pounds maximum push or pull load on the shock absorber ear. Casting design experience coupled with use of stress analysis techniques by the foundry's designers reduced weight from 4.2 pounds to 2.9 pounds while increasing the part's yield strength to nearly 3,000 pounds. Result: the pearlitic Malleable bracket performed better . . . cost 15% less!


◄ Steel stamping— 4.2 pounds
► Pearlitic Malleable casting— 2.9 pounds

Cost-Saving Engineering Assistance Available

The kind of engineering assistance that cut costs and improved product quality for these companies and thousands of others is available to you from any of the progressive producers of Malleable castings that are members of the Malleable Castings Council. Start increasing your product profitability right now — contact any of the companies listed below.

Free Information Folder

Your copy of an informative folder, *Data Unit 110—Malleable Castings in the Value Analysis Spotlight*, is available free from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, or from any member company.

For Quality and Economy . . . Use MALLEABLE

For Service In Your Area Contact . . .

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

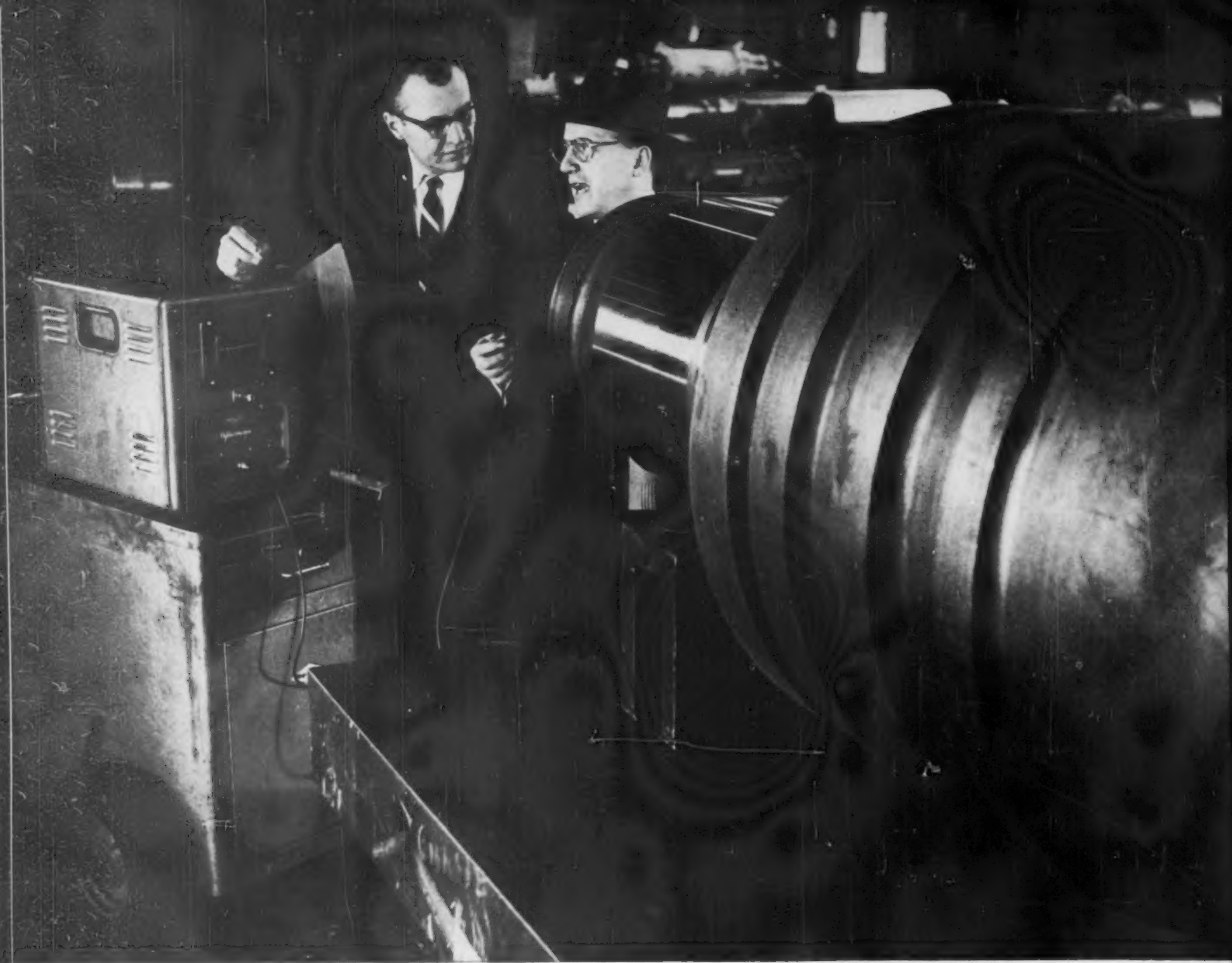
OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46



Another example of National Roll quality control

John Patton, National's assistant sales manager and Joe Marsalka, metallurgist, look over the reflectoscope "profile" of a steel roll.

No flaw escapes this electronic eye!

Your steel rolls from National are given a thorough examination by reflectoscope before shipment. Ultra-high frequency sound waves traverse every segment of the roll, electronically assuring the absence of internal flaws which might shorten the roll's service life in your stand.

This attention to detail and emphasis on high quality of product are two reasons why more and more steel makers are turning to National for their steel, iron and nodular iron rolls. From the moment you call a National representative, your roll problem gets the *personalized* attention of men experienced in analysis, design and production.

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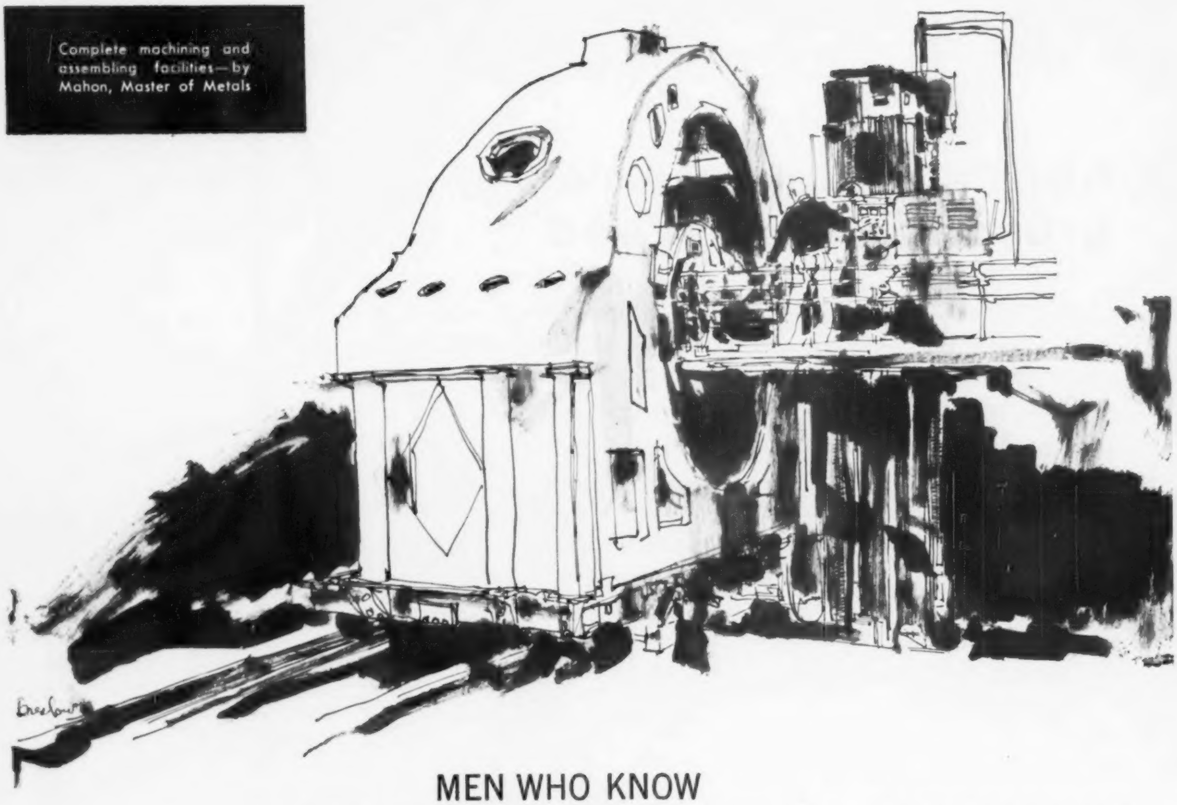

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U. S. EXPORTS ATTRACT STRONG FOREIGN BUYER INTEREST, a survey by American Foreign Service officers shows. Overseas buyers have a high regard for U. S. goods, but American selling methods and attitudes are frustrating. Some suggestions: Closer contact with foreign distributors, sales material printed in local languages, and prices quoted in local currency. (P. 79).

GROSS NATIONAL PRODUCT RISE in March quarter was sharpest gain since the September quarter of 1950. Rallying from steel strike effects, G.N.P. climbed to record seasonally-adjusted annual rate of $498 billion--up $18.5 billion over 1959 rate.

BOATING IS BIG BUSINESS and claimed to be the nation's top family sport. Last year almost $2.5 billion was spent for boating at the retail level. About 540,000 motors were sold.

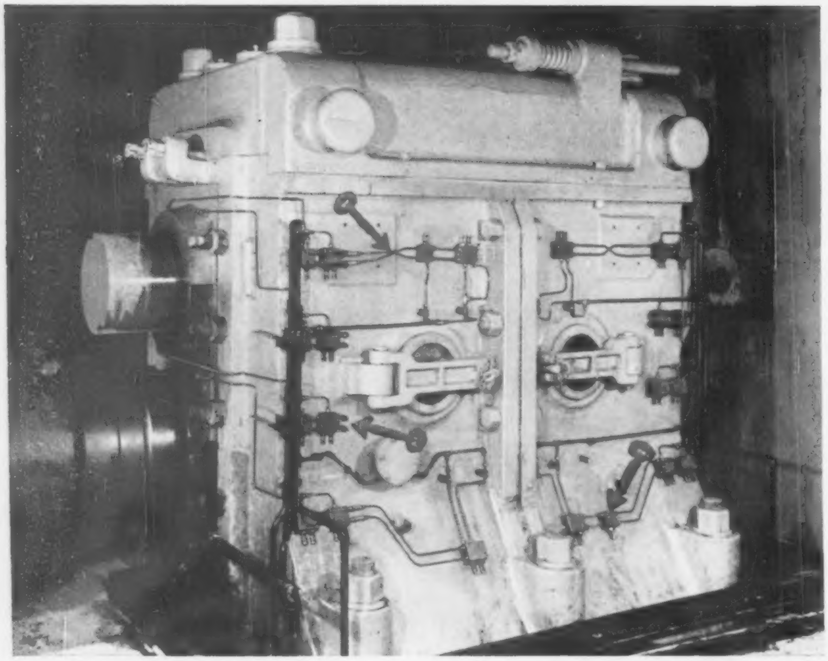
INDUSTRIAL DISTRIBUTORS' SALES PICK UP, according to a nation-wide survey of 173 members of National Industrial Distributors' Association. The survey shows sales for March up 18.1 pct over February, and 10 pct over sales in March last year.

FEBRUARY FOREIGN TRADE RISE is noted in both imports and exports. Imports for the month were $1,287.8 million, highest February total on record, and 13 pct above January. Exports (non-military) were up slightly over January to $1,480.3 million. Notable increases in imports: Automobiles and agricultural equipment; in exports: Aluminum and copper semi-manufacturers.

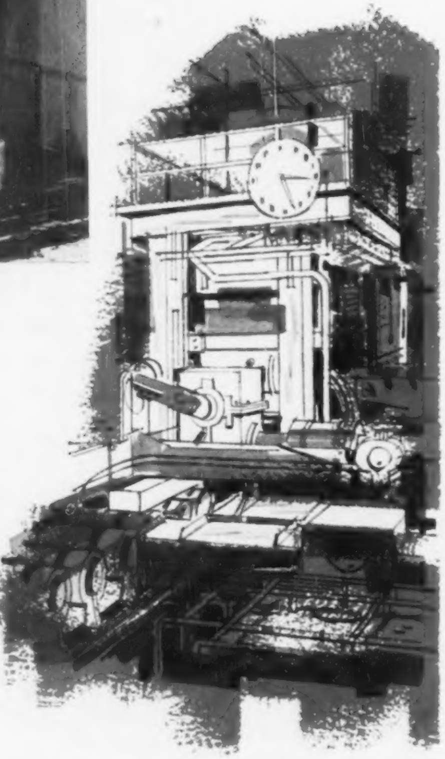
SECOND HALF BUYING PLANS OF MAJOR industries vary. But a sample of 30 important metalworking companies indicates second half purchases will be about equal to first half. Farm equipment, appliances, construction and electronic companies will buy more. Automotive and warehouses range from 25 pct gain to that much less. (P. 65).

SALES PERSISTENCE PAYS OFF. A top sales executive claims that 80 pct of all industrial sales are made after the fifth call.

MATERIAL HANDLING EQUIPMENT ORDERS UP. This is shown in the monthly bookings index of the Material Handling Institute. Dollar volume of orders rose to 128.74 in the index (statistical year 1954), up 13.78 over January.



Farval lubrication helps keep Acme Steel's blooming mill on 'round-the-clock operation



KEYS TO ADEQUATE LUBRICATION—wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and pump stations—you know rolling mill equipment is being properly lubricated.

Here's the delivery end of a recently installed Farval air-operated time clock-controlled spray system. It provides dependable 'round-the-clock lubrication at 18 points for the internal gearing in this new blooming mill pinion stand at Acme Steel Company, Riverdale, Illinois. An engineered overflow arrangement returns the lubricant back to an air-operated barrel pump attached to a 400-pound drum.

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How Industry Plans for 2nd Half

Purchasing Executives Have Mixed Feelings

It depends on the business and the factors that each must face independently, but no firm second half pattern develops.

Top executives report on their second half plans in exclusive interviews with The Iron Age.—By K. W. Bennett.

- General Motors Corp., probably industry's biggest spender, indicates that its second half purchases will run at about the first half level. This is counter to the auto industry's normal practice of buying 10 to 15 pct less in the second half than in the first.

An IRON AGE survey of 30 important metalworkers shows many will follow the GM pattern. They'll buy about as much in the second half as in the first. Some will buy more. Others will reduce second half buying.

No Rule of Thumb—There's no hard and fast rule, but it's reasonable to expect a drop in buying in the second half. It has happened often enough in the past to be regarded as typical by many market researchers.

And it looks as though the annual downtrend may be getting an earlier-than-usual start this year. For example, a check of 15 metalworkers shows they are cutting second quarter purchases by nearly one-third. And steel buying is getting the biggest slash. Components won't fare nearly so badly. Many are buying castings and stampings at normal rates despite sharp cuts in steel purchases.

Inventory Under Scrutiny — At present, buyers are still in the mood for inventory reduction. Primary target is steel. But procurement of other metal and components is also being cut. Most, however, indicate that inventory cutting will end in June.

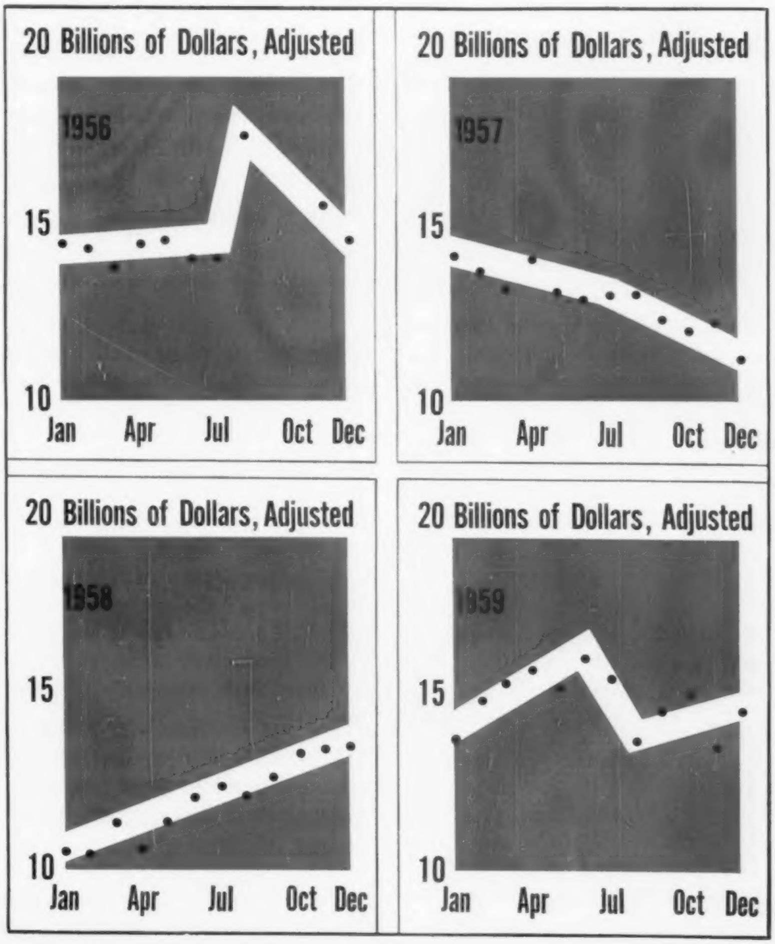
What then? Plans vary from industry to industry, and between companies in the same industry.

From Men Who Know — Here's what leading buyers see for the second half:

E. W. Bernitt, vice president-automotive operations, **American Motors Corp.,** believes second half buying by the auto industry will follow the historical pattern and fall 15 pct below the first half. However, he points out that American

How Will 1960 Look?

New Orders, Durable Goods Industries



More Buying Planned By Some

E. A. Channer

Vice President-Sales
H. M. Harper Co.

"We expect that overall purchases of materials by our firm will run about 5 pct ahead of first half levels during second half 1960, based on our second half business projections. Our first quarter sales have run 25 pct ahead of last year, and last year was our best year."

F. J. O'Brien

Vice President of Purchasing
Motorola, Inc.

"Traditionally, the second half for our company is the highest buying period, because it is strongly influenced by our consumer products. We expect this year to increase our buying activity by 25 pct over the first half of the year. And this is standard for our business."

Motors' total purchases in 1960 will exceed 1959 by about 25 pct. And, he says, the company's second half buying should also exceed the same 1959 period by a like amount.

A purchasing executive at **Ford Motor Co.** notes: "The auto industry traditionally produces less than 50 pct of its annual output in the last six months of the year, thus its purchases are less in the last half of the year. In 1960, this decline in purchasing in the last six months will be about 5 pct greater than usual."

Cyclical Factors—"The principal reason for this decline is that the industry had an abnormal first quarter in which production was necessarily high to compensate for production lost because of the steel strike in 1959."

Farm implement makers are divided in their plans. **International Harvester Co.** plans to reduce buying; **John Deere & Co.** will buy more.

Explains **L. G. Woods, International's** director of supply and inventory: "The seasonal nature of our business and the necessity of stocking our dealers and distributors in advance of the spring and summer selling seasons results in slightly higher production in our plants in the first half of the year."

On the Up Side—R. Edwards, John Deere's vice president of purchases, expects to follow the company's normal buying pattern. "So far as steel is concerned, our second half buy will be about normal, and will exceed purchases in the second half of 1959. I believe we will buy 15 to 20 pct more steel in the second half than in the first. In short, taking all consumable goods purchases, we should have a normal second half.

"Due to the seasonal nature of our business, we normally increase inventories in the final calendar quarter to provide for heavier production in the winter months."

More on Inventories—What's left in the wake of the first half's inventory splurge will have an important effect on second half buying plans. Some buyers are already checking into availability of steel in September and October. This is particularly true of smaller users who now depend on speedy mill delivery to keep production going.

But others still have high inventories. **J. M. Mead,** vice president-procurement, **Joseph T. Ryerson & Son, Inc.,** says: "For the second half 1960, we estimate our purchases will be less than the first half. This is based on two factors.

"First half buying consisted of a combination of inventory rebuilding and buying for a high anticipated sales rate. Second half buying will recognize the existence of larger inventories than we expected to have at mid-year. Therefore, we estimate our buying for the last half of the year may be in the range of 10 pct less than that required to replace our sales."

Turnabout—"At the start of the year, with a more optimistic forecast for the first six months of 1960, we were saying the second half would not be as good as the first. Now we believe the second half could be as good as the first half, possibly a little better."

A cut in inventories will also continue at **Kropp Forge Co.** according to **A. F. Tydeman,** director of purchases.

"We expect to purchase 5 to 10 pct less in the second half than in the first, despite an anticipated increase in sales volume. As a result of a gradual inventory reduction program to be in effect for the balance of the year, purchasing will remain at the lower figure," he says.

A Second Half Vote — General Electric Co. plans on stepping up its second half buying according to a purchasing executive. "Buying from normal sources in the second half probably will exceed first half levels, returning buying levels more nearly to a normal pattern. This is the result of a higher than normal inventory situation during the first half of the year."

And a second half increase is also slated for **The Trane Co.** Says **W. J. Hood,** executive vice president and treasurer: "Second half buying plans of the U. S. operations of The Trane Co. call for a 17 pct increase in purchasing during the second half of 1960, over first half purchasing levels. We expect 1960 purchasing to be about 15 pct ahead of purchases made in 1959, which was a record year for Trane."

Korhumel Steel and Aluminum Co. will boost its second half buying substantially, also, says the company's president, **N. F. Korhumel.** "We have three to four months' inventory equalizing to do. But our new purchases in the last half should be 20 to 25 pct higher, even though business is still drifting downward."

Price Questions — Metalworking buyers are also concerned over the possibility of steel price increases later this year. Typical of this is the concern voiced by **R. S. Rice,** director of purchases for the Laundry Groups, **Whirlpool Corp.**

"The laundry group procurement volume during the last half of 1960 should remain relatively unchanged from the first half. The effect of our program to maintain minimum inventories at the divisions will probably be offset by increased production requirements resulting from forecasts of increased sales."

But, he continues, "We are deeply concerned about the possibility of a steel price increase later in the year, particularly in view of the extremely competitive conditions which exist in the appliance market."

No Scare Buying — However, there is little evidence that fear of a price rise will stimulate steel buying later this year.

Most purchasers are convinced that the cost of carrying a large inventory of steel usually mounts up to more than is saved by beating a price increase.

Inventory Cutbacks—What's going to happen to inventories is still anybody's guess. Most of the strict control is out of the way and users are now analyzing their levels to determine the new pattern.

While it's common to blame slow steel operations on inventory control, few actually appreciate the full impact of inventory cuts. One major metalworker cut second quarter purchasing on all items by 40 pct. This is in spite of the fact that 1960 sales of his product should hit the record level of 1959.

The Outlook—The outlook for the second half, if buying plans are going to be followed, is mixed. But on the heels of a very weak second quarter in terms of new orders, it looks stronger than the pessimists fear.

. . . While Others Will Cut Back

J. M. Simpson

President,
A. M. Castle & Co.

"It is presently planned that inventory reduction will continue through the second half, with purchases running 10 to 20 pct under sales, and at a rate of about 70 pct of first half purchases. The above long range planning is tentatively based on predicted sales for the third quarter being slightly less than the second quarter, and a small increase in sales for the fourth quarter over the third."

K. R. Geist

Director of Purchases
Allis Chalmers Mfg. Co.

"We see no greater buying rate in the second half, but 1960 purchases will exceed 1959 by at least 5 pct. Sufficient inventories of materials are available or on order for delivery during mid-and-late 1960 to take care of present production schedules. The strong return of the steel industry earlier this year was an important factor in formulating present buying plans of consumable items."

Developers Battle for Industry

Strong Competition Faces Industrial Groups

Thousands of industrial development groups are fighting one another for new businesses.

They are looking for new industry to bolster their area's economies.—By M. J. Tatich.

▪ If you're planning to relocate or build a new plant, thousands of industrial development groups are after you.

There are about 14,000 of these groups operating throughout the nation. They are eagerly looking for new business for their respective areas. And they will fight to get it.

Secret Talks — Competition is keen. A wide range of enticements is offered to make one locale sound better than the next, and dealings are kept as secret as possible to keep other groups from having any opportunity to steal away a prospective new business.

In 1957 these groups spent $220 million on development activities. Railroads were the leaders with expenditures of more than $50 million. State agencies spent about $20 million, and utilities about $8 million.

Preservation—But not all of this went just to get new business. A great part went to keep existing businesses from moving to new locations.

Why the big search for new business and the effort to keep existing industry? A rapidly growing population is one of the main factors. Cost of government has risen sharply in the past few years and taxes collected from industry help lighten the load considerably. Municipal officials would rather tax an inanimate industry than people.

Good Assistance—Development groups are always ready to listen to the needs of industry. And they can be helpful. (See box.) They will assist in finding the best locations, aid with financing, investigate labor potentials and research markets.

Most development groups were formed after World War II. And at that time most of their finds went for research and planning. But today the biggest budgets are being laid out for promotion.

Touring Company—One example of this is the program being carried on by the Cleveland Electric Illuminating Co. The firm has a team of development experts touring the nation to attract business to the Cleveland area. Its purpose is twofold. One is to get more industry into the area and increase sales. The other is to bolster the economy of the Cleveland area.

They have gone into areas where other development groups are operating and shown films and given talks on the advantages enjoyed by industry already existing in Cleveland. And their market has been all types of industry. Available land and facilities are stressed and the financial status of the area is used as a strong selling point.

Tax Loss Threat — Another group operating to get more business is the relatively new Philadelphia Industrial Development Corp. It was formed a few years ago when the City of Philadelphia realized it was threatened with losing huge tax revenues because existing plants were leaving Philadelphia and new

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What Developers Will Offer

Here are some of the services developers provide in order to attract industry:

Labor Studies: Immediate labor force will be surveyed to find if enough potential workers are available to suit individual needs. Special interest is paid to the need for skilled and professional employees. Also labor union practices can be explored.

Transportation: Accessibility to markets can be studied. Transportation will be analyzed to locate the best routes. The most efficient ways to transport raw materials and outgoing finished products will be checked. Highways will be studied to see if plants are readily accessible to workers.

Financing: The best and simplified means of financing new plants will be offered. In many cases, special financing arrangements will be worked out.

Location: Land best suited to the needs of the industry will be sought. Nearness to fast transportation and the working force will be carefully considered. Existing buildings will be regraded if necessary. Those providing the most efficient floor plans and facilities will be offered.

Special Inducements: Some regions build plants and sell or lease them to new industries. Others offer monetary arrangements which will ease the salary load of a business while training of new employees is in progress.

ones weren't coming in.

Now, the PIDC has hundreds of acres of good industrial land available for development. A non-profit organization, it has been highly aggressive in attracting new business to Philadelphia. It has dealt with nearly 300 industries and has located several within the city and the PIDC has been successful in keeping plants with huge payrolls from leaving the area.

About its future? During 1960 and 1961 the PIDC expects to conclude several deals that will bring new industry into a city once threatened by potential industrial starvation.

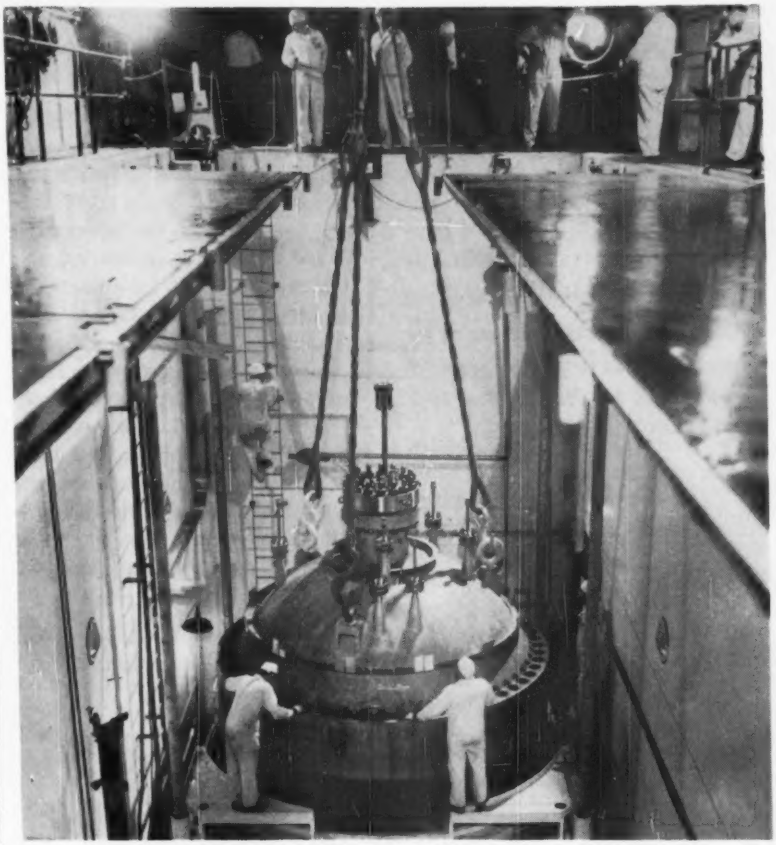
The Aggressors — The most aggressive groups in the development race are railroads. The Pennsylvania Railroad has nine full-time regional development managers. Their job is to attract new business along the road's right-of-way.

And they have been very successful. In 1959 the PRR located 225 new plants, aided in 149 plant expansions and made available 84 temporory industrial locations along its tracks. And these figures have been almost constant during the past four years.

The PRR now has thousands of acres of land available for industrial plants. And it is keeping an open eye for even more acreage that can be used in the future. It is not uncommon for the road to buy land that will not be used for years, but will be kept in reserve to best fill the needs of a particular industry.

And the PRR is not the only railroad doing this. Several of the nation's top roads have just as extensive programs underway.

More Competition—What do the majority of development groups foresee in the years to come? Competition among the groups will become even greater. They will strive to eliminate as much unemployment as possible in their areas. And they will try to get more taxable industry.



50-TON LID: Massive top is lowered onto atomic reactor vessel for the nation's first privately financed nuclear power plant at Chicago.

Nuclear Power Plant Goes On Stream

▪ The nation's first privately financed nuclear power plant has started pouring current into Chicago's electric system at a 90,000 kw rate. Dresden plant of Commonwealth Edison is the first privately financed commercial atomic power plant to begin generating electricity in the U. S.

The $45 million plant will hit 180,000 kw output this summer—enough electric power to serve a city of 200,000 persons. With a gross rating of 192,000 kw, Dresden is currently the largest in operation. It is a boiling water-type reactor and the core, filled with 60 tons of uranium dioxide pellets, is good for 3.5 years.

The atomic scoreboard: New York Consolidated Edison Co.'s 275,000 kw plant, valued at over $90 million, is due late in 1961. Yankee Atomic Electric Co. expects to have its $62 million, 145,000 kw plant operating this year. Detroit Edison Co.'s Enrico Fermi plant is scheduled to open in 1961.

The pioneer commercial nuclear electric plant is Duquesne Light and Power Co.'s 60,000 kw plant at Shippingport, Pa. It started up in 1957. However, the Atomic Energy Commission paid part of the cost.

Old Labor Issues Still Smoulder

It's Not Too Early to Plan for Next Steel Contract

Personal, impersonal and psychological factors are still active long after settlement.

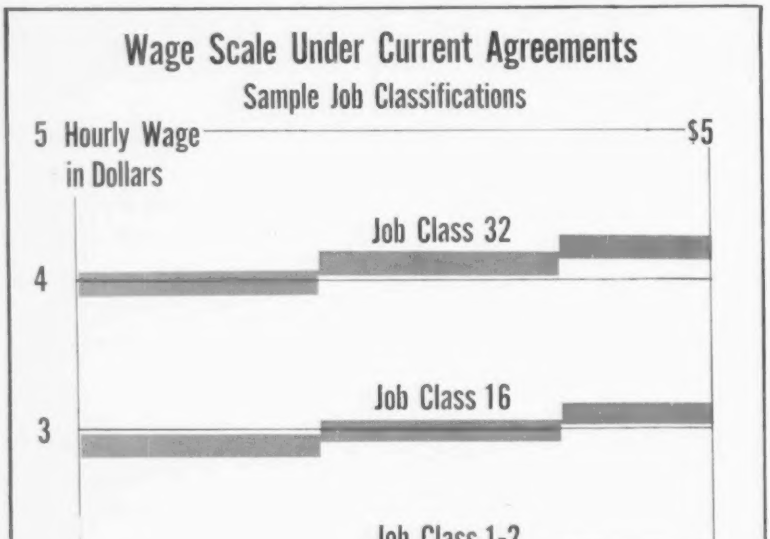
Only some thoughtful work by labor and industry can prevent a repetition in 1962 of the last hassle.—By Tom Campbell.

■ Some steel executives and labor chiefs believe it is too early to take a reading on their relations with each other. They feel it is far too soon to wonder if there will be another strike in 1962, if it will be a long one, if the union will get another raise, or if the government will put its two cents worth in again.

Of course it isn't too early at all. Especially if you talk to both sides, check past history and interview steel industry customers. There is plenty of fuel ready to be thrown on the fire early in 1962—if not before. So far, despite protestations of a better feeling between the union and steel officials, there is nothing to suggest that the 1962 battle will not again be fought the hard way.

Personal Factors—Reports that there are better relations at the plant level are 100 pct correct. Relations at the plant level were good before, during, and after the last steel strike. They had nothing at all to do with the impasse at the management and union top level.

And What's the Next Step?



*Same as wage rates in effect under old contract, not counting 17¢ per hour cost of living adjustment already in effect.

**Not counting the 17¢ C-O-L adjustment in effect Jan. 1, 1960, and a possible adjustment not exceeding 3¢.

***Not counting the 17¢ C-O-L adjustment and a possible additional adjustment not exceeding 6¢. Source: Steel Facts

There are personal factors which may take years to soften—if it can ever be done. There are the usual misunderstandings, lack of communications, and general gulf between the goals of both sides. There is nothing new in them. But the personal stigmas cut deep.

Impersonal Factors, Too—But to add to the personal factors in the steel industrial relations problem—at the top—are impersonal factors. These carry a lot of weight—with management. There is the problem of foreign competition. No matter how much it is downgraded, it is still there and over the years will be more and more a dominant factor.

There is the well concealed but bitter indictment which many steel customers retain against the steel industry. Publicly, it is hardly ever expressed. But in the background and in private conversations, many large and small steel consumers blame the steel industry for the present high wage pattern and the current high steel prices.

Even though the steel industry has taken six bitter strikes, many of its most important customers harbor the feeling that it never fought hard enough.

Automation Raises It's Head—A third and important factor that will make negotiations difficult is automation or new equipment. This has two aims, to cut unit cost and reduce the need for additional employees. The need for lower costs is to cover past wage increases and competition.

The loss of jobs is a natural

sequence from a long line of wage and fringe increases which are in excess of productivity. Management will use this factor to the best of its ability. It feels it has to if it is to survive with earnings which steel leaders claim are a necessity —if the industry is to remain strong and active.

Negotiations Leave Scars—Union officials privately are still burning over the methods used by steel management in the last "bargaining" sessions. They insist that there was no bargaining—just a set position. They are even unwilling to concede that management was ready to give in except at the insistence of Vice President Nixon. Even then, some union officials feel that the sponge was thrown in for political reasons and not because the steel industry wanted a settlement.

As to foreign competition, the union is on record that it is a drop in the bucket as far as any U. S. steel labor settlement is concerned.

So it goes without saying that unless labor chief Dave McDonald is convinced that the steel industry will suffer seriously from foreign competition, this point will be bitterly dismissed.

Price Considerations — On the personal feelings of steel customer management, it is easy to see that it will stiffen the spine of steel management. While steel officials insist that they did not crumple before the union without a fight, they are worried about what some of their customers think about their virility in times of labor warfare.

No manner of convincing will change some of these steel customers. And most look for another steel price increase. So again it goes without saying that, come the next bargaining session, the customer will be uppermost in the steel industry's mind.

But the customer will be there for another reason. He is going off in all directions seeking, using and thinking up substitutes for steel or for anything to save wage dollars. This, despite the greatest forward movement in history in the steel industry's laboratories.

What Makes Dave Fight—Supposing, then, that imports, and, to some extent, steel prices were licked. What then about automation and the injection of brand new plant and equipment all along the line? Having lost their battle on the top level to do away with local practices — which apply to old equipment, not to new plant and equipment—steel firms will place more emphasis on new mills, new equipment, new techniques and less man hours per ton of steel made. This means making more steel with fewer man hours—or fewer employees.

Psychological Factor — There again comes a factor that is well labeled psychological. Before the last labor hassle, Dave was given to understand that the steel industry thought he was getting too big for his pants. With social psychologists already proving that labor leaders often have an insecurity complex when it comes to status, whoever advised this treatment for Mr. McDonald probably should take a share of responsibility for the long steel strike.

The Outlook—Steel firms will want no wage cost increase and the union will want bigger and better ones. It is within the realm of possibility that private meetings might head off another serious steel strike. But with the public relations arm of the steel industry—led by the major company—already "looking the situation over," there may be another battle for the public's mind.

If this is to be without the "eight points," it might succeed this next time. But if the personal angles get rougher, and there is no quarter for either side, it is a cinch that the government will again step into the boiling caldron. It is that possibility which causes many steel users to reluctantly believe that once again —in the spring of 1962—steel will be tight. They will be stocking up then to put the pressure on Dave —unless both sides go out to pasture together for a long hard talk.

The Issues Are Still Alive

The issues of the 1959 steel strike are not dead—months after the settlement of the bitter negotiation. Neither side is willing to forget it; both sides are still arguing it.

Only last week in McKeesport, Pa., R. Conrad Cooper, chief negotiator for the steel companies, defended the settlement as a good one.

He then declared as "absolutely not true" allegations that continue to crop up long after the signing.

He denied: That the contract is a loss for the companies—that it would have been better to have accepted terms comparable with those reached by other companies —that there were "political overtones" in the final outcome.

Nevertheless, Mr. Cooper did concede government influence when he said: "Eventually, and by virtue of circumstances, the steel companies accepted a settlement recommended by certain government officials."

Mr. Cooper said the settlement can be judged from two viewpoints: How did it measure up as compared to the companies' objectives? How did it compare to previous agreements?

Mr. Cooper also said there is considerable disagreement about the workability of periodic meetings by union and management representatives, but promised that he and his associates with work diligently on the problems.

"The objective we seek," he declared, "Is a return to sound economics and the opportunity to manage our business efficiently. It is an objective we believe worthy of affirmation."

POLICY COMMITTEE: All ideas in research program at American Brass Co. clear through this top committee.*

Research Idea Plan Pays Off

Executive suggestions are key to broad-scale research plan at American Brass Co.

Task Force system used to get facts on ideas. President's personal letter to suggestors spurs plan.—F. J. Starin.

■ One day, less than a year ago, a suggestion came in to the American Brass Co. headquarters in Waterbury, Conn., from one of the 800-man management team running its 11 divisions.

The company should make a line of dagger boards and center boards for sailboats, it said. Everyone who saw it flinched — except for one vice-president whose hobby was sailing.

He explained to his fellow executives that while steel is most commonly used, some bronzes actually perform much better. However, mass-produced steel board costs $60. A bronze one had to be specially made for about $250.

Wheels were set in motion. Result: Essex Machine Works Inc., downriver from Waterbury is now offering mass-produced bronze dagger boards for $89.

Ideas Flow—This is one of 650 proposals made by American Brass's 800 managers in the last year. Of these, 212 have shown enough promise to be considered further.

Management suggestions are the backbone of the program initiated by company president Richard Stewart just about a year ago to boost the then sagging profit margins and competitive position of American Brass.

Research Needed—The answer, decided Mr. Stewart, was research. But this, as he sees it, embraces market development, improved manufacturing techniques, product development, and just about anything practical to "keep competitive and increase sales and earnings."

There were some major problems in such an approach. Both company supervisors and management, and customers had to be convinced American meant to do more than give the program lip service.

Tight Budget — Also, there was no precedent for a program of any scope. And the budget, because of the very situation the program aimed to cure, was limited.

Mr. Stewart met the first problem by making sure that every suggestion went through his hands. If a suggestion is rejected the author gets a personal letter from the company president explaining specifically why.

Carl Woodward, director of market planning, says this helps keep suggestions rolling in from salesmen and management personnel.

"If the president of the company is that interested," Mr. Woodward explains, "everyone knows his suggestion is getting a top priority."

Top Committee — The apex of this program is the Policy Committee. Mr. Stewart is the chairman. The vice presidents of sales, metallurgy and research, manufacturing, and the director of market planning are other members. The committee meets at the call of the president.

Before a meeting each member

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*Left to right, Justice Lockwood, vice president in charge of sales; John R. Freeman, Jr., vice president—metallurgy & research; Richard M. Stewart, president and chairman of the R&D policy committee; Carl E. Woodward, director of market planning and executive secretary of the policy committee; Sidney H. Wardell, vice president—manufacturing.

has a copy of each suggestion. The ground rules say a man must never says, "We've tried that before," and he must rate a suggestion only in his specialty.

Ratings are in feasibility, desirability, and practicality. And suggestions are classified as products —new or improved; processes—new or improved; basic research; putting research into production; mill projects; customer development; market research.

No one screens any suggestion until policy committee sees it. And even here, no one man can veto it. Ratings are discussed, and each man must be ready to justify his position.

Task Force—If a suggestion is judged promising it is passed on to the Task Force. This group is chairmanned by the director of market planning (secretary of the policy committee) and has the assistant general sales manager, a top production engineer, and top metallurgical engineer as members. Its function is to get all the facts.

Usually a project is assigned to someone within the company who does what is needed to research the idea.

Carl Woodward notes that at the time the program was being set up the choice got down to either hiring a consultant, a new staff, and superimposing it on the current staff. Mr. Stewart adapted the last among other reasons, because he felt his people already knew what some of the problems were—half the battle.

Big Success — After a year of operation the program has been pronounced an unqualified success. American Brass has so many promising projects in the works that it will build a new $1.5 million, 50,000 sq ft research center. Some of the materials to be used in the building have been developed or improved in the program that makes the lab necessary.

And some other mills have already or will soon, launch their own research and market development programs.

Tinplate Slims Down To Widen Markets

Details on a new lighter, stronger, and thinner tinplate are made public by U. S. Steel Corp.

Among the most promising markets: Oil cans and frozen juice cans.—By G. J. McManus.

▪ Faced with customer and competitive pressure, tinplate is trimming off extra weight and toughening its muscles.

The effort takes two forms:

Producers of tinplate are pushing for new ways to reduce the thickness of can making stock.

The mills are rapidly converting to continuous annealing for tinplate.

Both programs relate to using a greater percentage of the strength available in steel. Using stronger material, tinplate men are working to make cans with less material. The annealing push may have more immediate significance in this respect but the sweeping potential of thin tinplate has attracted wide publicity.

Lighter, Stronger, Thinner—First public work of the new product came early this year at the canners convention. At that time, Roger Blough, board chairman of United States Steel Corp., referred to development work on a tinplate that would be "lighter, stronger and thinner than . . . any used."

This week the Corporation filled in some of the details of its program. A new process is being used to produce tinplate that weighs from 40 to 60 lb a base box. This is "about half the thickness of anything now used in can making."

Markets Waiting—According to U. S. Steel, the new product has "additional strength and rigidity." Production is still in the experimental stage. No cost or price figures have been given out but the likelihood of savings is indicated.

The applications most frequently mentioned for thin tinplate are those where the container is not subjected to the pressure of high temperature processing. These include oil cans and frozen juice cans.

Tinplate is bidding for established aluminum markets. In the case of baking pans and dinner trays.

Competitive implications are not lost on tinplate men. They say thin tinplate will give a tougher combination of weight, strength, and cost for aluminum to buck.

Good Potential—However, the potential of thin tinplate extends beyond low pressure applications, say steel men. They point out the material can be soldered. They say it has the strength for hard service.

Pan and tray applications are considered interesting, but mills say they are not big enough by themselves to support the equipment outlay required. "The can thing has to go for thin tinplate to become commercial," says one sales executive.

The question of pricing is being carefully avoided at the moment. Weight savings will reduce freight and give the consumer a lighter can to carry, tinplate men say. Overall economics will have to be worked out before costs can be pinpointed.

Annealing Important—Continuous annealing has been a factor in thickness reduction. The continuous method gives a sheet that is relatively stiff. This permits use of thinner stock. Because of this economy, can makers have reportedly been pushing for more continuous annealing capacity.

Steel Firms Study Export Problems

American steel companies expect to regain this year some, if not all, of the $200 million in steel product exports they lost during the 1959 strike year.

Steel company representatives at the Department of Commerce's export trade conference in Washington said they expected exports of steel products to shift toward the 1958 export figure of $548 million. Total exports in 1959 were $348 million. Major exports of the industry are rails, strip, pipe, tubing, and sheet steel.

The meeting was one of eight weekly meetings the Department is holding with key industries as a part of the Government export promotion program.

Licenses Resented — Some 30 representatives of the nation's largest steel companies and steel organizations said that foreign tariffs didn't bother them too much. They were bothered, however, by the U. S. government requirement that licenses be obtained to ship steel products to friendly countries. They said they could understand the ban on shipping materials considered strategic to Iron Curtain countries, but not those exported to U. S. allies.

Special Problems—Two specific problems pointed up in the conference were: The problem of special taxes U. S. businesses have to pay for export to certain countries, such as France and Australia. And the lack of good data of comparison of foreign and U. S. steel specifications.

Secretary of Commerce Frederick H. Mueller told the steel men that the government would do its best to clear away any roadblocks to the expansion of steel exportation.

Raise in Minimum Wage Asked

Labor Secretary James P. Mitchell has asked Congress to approve a "moderate" increase in the dollar an hour Federal minimum wage.

In testimony before a House labor subcommittee, Mitchell recommended that Congress increase the wage floor by 10 to 15 cents. He also has endorsed extending wage-hour law coverage to an additional three million workers, mostly in retail trade.

But Mitchell said Democratic-backed proposals to raise the minimum to $1.25 and broaden coverage to nearly eight million more workers would create a great deal of unemployment through job loss by great numbers of low paid workers.

Mitchell's proposal has the backing of President Eisenhower.

How to Plan Warehouse Buys

Item Weight	20,000 & over	10,000 to 19,999	5000 to 9999	2000 to 4999	1000 to 1999	400 to 999	100 to 399	Under 100
10,000 lb and over	(NC)	(NC)						
5000 to 9999 lb	(NC)	(NC)	(NC)			Dollars per CWT		
2000 to 4999 lb	(NC)	(NC)	(NC)	+.20				
1000 to 1999 lb	(NC)	(NC)	(NC)	+.20	+.60			
400 to 999 lb	-.25	-.25	-.25	-.05	+.35	+1.25		
100 to 399 lb	-2.00	-2.00	-2.00	-1.80	-1.40	-.50	+2.25	
Under 100 lb	-3.00	-3.00	-3.00	-2.80	-2.40	-1.50	+1.25	+5.25

Column headings were incorrectly positioned in the table on new service center item quantities which appeared in the April 14 issue, P. 126. For clarification and future reference in buying, the correct table appears above.

These new warehouse prices on small item quantities represent important concessions, if properly used by buyers.

The table shows minus signs for order quantity, item quantity price reductions. Plus signs indicate increases.

If an order falls into a "plus" area on the chart, indicating higher costs, check the possibility of combining items for larger order quantity, or stepping up item quantity for savings.

Oxygen Facilities Enlarged by Linde

Oxygen-producing capacity of Linde Co., div. of Union Carbide Corp., will be increased by 4000 tons a day through scheduled expansions at 16 locations in the U. S.

Most of new capacity will serve the rapidly growing requirements of steel producers, Linde says. Among the facilities is the largest on-site plant ever built for the steel industry. This plant, which will go "on-stream" late this spring at the Duquesne Works of U. S. Steel Corp., has a capacity of 1000 tons a day of high-purity oxygen.

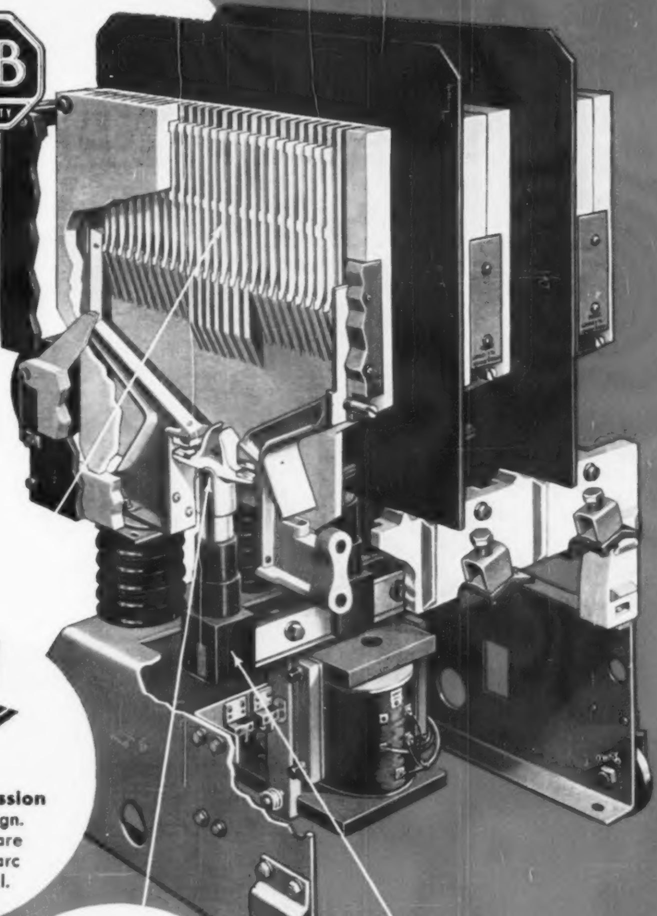
Linde has also concluded negotiations to supply requirements of Bethlehem Steel Co., National Steel Corp., Republic Steel Corp., Colorado Fuel & Iron Corp., Armco Steel Corp., and Detroit Steel Corp.

Scrap Tariff Ban

The House Ways and Means Committee has approved a bill (H.R. 11748) extending the current suspension of import duties on iron and steel scrap to June 30, 1961. Besides iron and steel, the suspension of duties would also apply to aluminum, magnesium, nickel and nickel alloys.

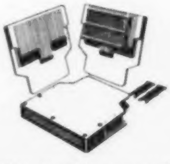
Here's the inside story of industry's

MOST RUGGED HIGH VOLTAGE SWITCH

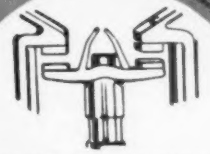


THIS SOLENOID AIR BREAK CONTACTOR IS THE HEART OF THE A-B STARTER LINE

A tremendous operating life has been built into these new A-B high voltage, air break starters by using the same simple solenoid design—with only ONE moving part—that has proved good for millions of trouble free operations in Allen-Bradley low voltage starters. A-B high voltage starters are made for all types of service and for all types of motors up to 1500 hp, 2300 v: 2500 hp, 4600 v. Send for Publication 6080, today.



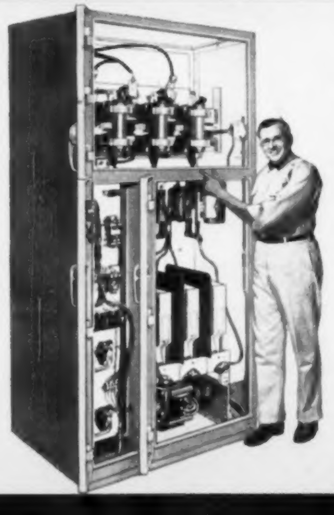
Faster Arc Suppression
New blowout design. Novel arc chutes are molded from an arc resistant material.



Double Break Contacts
Silver alloy contacts never need maintenance. Vertical motion assures uniform contact pressures.

Only One Moving Part
Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.

7-60-RM



A-B High Voltage Starter with Air Break Contactor

Bulletin 1159 high voltage air break, across-the-line induction motor starter in NEMA Type 1 enclosure. All Allen-Bradley high voltage starters are equipped with current limiting fuses with interrupting capacities of 150,000 kva at 2300 v; 250,000 kva at 4600 v.

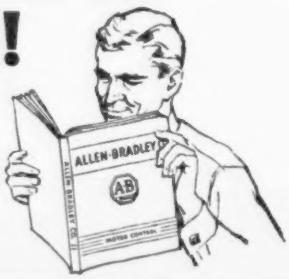
ALLEN-BRADLEY

Member of NEMA

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

Some more special controls that are "standard" with Allen-Bradley!



Even Khrushchev couldn't claim a more complete line!

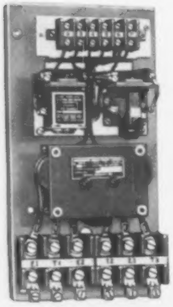
A-B QUALITY

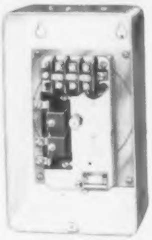
Phase Failure Phase Reversal Relays

The Bulletin 812 Style RF relay responds to *all* open phase conditions on a branch motor circuit and immediately removes the motor from the line. Also, the motor is disconnected when a phase reversal occurs anywhere in the system on the line side of the relay. "Fail safe" design.

Phase Failure, Style F covers f.l. currents from 1.5 to 300 amp in 4 sizes. Coils to 600 v, 60 cycles.

Phase Reversal, Style R made with coils for 110, 208/220, 440, 550 v for either 50 or 60 cycles.


Bulletin 812 Style F


Bulletin 812 Style R

Zero Speed Switch

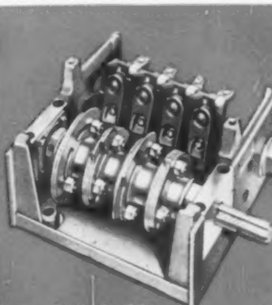
Used for "plugging" duty, these switches prevent coasting and bring squirrel cage motors to a sudden stop. Also used to prevent application of reverse power before motor comes to a full stop. Adjustable operating speed.

Bulletin 808

Low Pressure Switch

Especially designed for domestic water pump service and commercial air compressor service. These inexpensive compact switches offer pressure ranges from 15 to 200 psi.

Bulletin 830


Bulletin 803

Rotating Cam Limit Switches

Heavy-duty pilot controls used on rotating machines to initiate functions at any point of rotation. Made with up to 12 individually adjustable, independent circuits.

Bulletin 805

Foot Switches

Built for toughest service. Has maintenance free, snap-action contacts. Extended-base prevents tipping. Made with hood (left), with top guard and without guard.

Bulletin 836 Style T

Pressure Controls

Oiltight enclosure for machine tool hydraulic systems operating at pressures up to 5000 psi. Operating pressure and differential are adjustable. Indicator shows trip point. Silver contacts never need service attention.

Bulletin 837 Style A

Temperature Controls

Newly designed bellows provides lower differentials. Rugged construction permits continuous cycling from zero to maximum setting. Vibration or mounting angle will not affect accuracy of operation. Temperature ranges from —150°F to 490°F.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY

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Quality Motor Control

7-60-RM

Don H. Gearheart

Metalworking Became His Forte

D. H. Gearheart, president, Hupp Corp., started his career as a public relations man.

But as the years passed he got closer and closer to metalworking and his present job.

- Twenty years after the old Hupmobile went out of production, its parent, Hupp Corp., is tooling along stronger than ever. It has eight plants in six states. And the man behind the company is Don H. Gearheart.

Under his guidance it is prospering in heating and air conditioning equipment, stoves, refrigerators, heat pumps, aviation and automotive parts, and missile work.

Double Turn—But Hupp's radical transition from an auto builder has been no more of a complete switch than the career of its president.

Hupp now gets 45 pct of its income from air conditioning and heating products. Another 35 pct from household appliances, and the remainder from auto, aircraft and missile parts.

The last Hupmobile was built in 1939. Shortly after, Hupp went through reorganization. In World War II it revived to turn out cartridge cases and machined parts. Mr. Gearheart joined the firm when it merged with Globe Machine and Stamping Co. in 1944 and Globe's management took over. He became a Hupp vice president, and 10 years later became the firm's president.

Unrelated But Organized — The streamlining of the company began with closing of stamping operations. The gearmaking plant was extended to include precision machining. Varied operations such as aircraft valve guides, bushings, valve operators, stove and other unrelated parts have been integrated into a smooth running organization. All are in metalworking, but the relationship more or less ends there.

DON H. GEARHEART: A huntsman and commodore.

It is significant that Don Gearheart's own business career has taken more twists than Hupp. For one thing, he graduated from Butler University in journalism, not engineering or business.

A New Job—In his thesis he stumped for a public relations department for the school. So on graduation in 1928 the trustees hired him to organize one and get it going. A year later at the height of the boom a friend at Peerless Motor Cars offered him the task of coordinating sales and promotion, which he accepted. Pearless ran out of gas in the depression and Mr. Gearheart went back to college public relations—this time at Case Institute of Technology in Cleveland.

Oilman—At the bottom of the depression there wasn't much to advertise so he did another about-face and became a service station trainee. He rose to sales manager of this firm. He joined Globe in 1942.

Off Duty Jobs—Mr. Gearheart's favorite relaxations are hunting and yachting. Even in hobbies he ends up with a job. He is president of the Buckeye Retriever Club and a past commodore of the Cleveland Yacht Club.

NO CORROSION ON STRIKE-BOUND STEEL KEPT BRIGHT WITH FERRO-PAK® BY CROMWELL

For 116 days one of the largest producers of steel held thousands of tons of polished steel—unable to move it because of the strike.

Most of this plate was covered with Cromwell Paper Company's Ferro-Pak VCI paper—the packaging paper that provides an invisible protective film of chemical vapors to guard against rust. Through hot days, cool nights, weeks of sultry, steamy weather, the steel was protected. When the paper was removed, there was no edge rust. The steel was almost 100% rust-free.

Steel held in the same plant without Ferro-Pak protection was heavily attacked by rust.

Non-toxic vapors of Ferro-Pak are effective almost indefinitely. With any ferrous product, you simply wrap it and it's rust-proofed; unwrap it and it's ready for use. No dipping, slushing, scraping. No expensive cleanup.

Ferro-Pak comes in rolls, sheets, bags, envelopes, liners and covers. And we combine it with many other materials for a wide range of uses.

Why not talk to your steel supplier about protecting your steel shipments with Ferro-Pak. Or write for detailed information.

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Manufacturers of: Papers (Impregnated • Coated • Laminated • Reinforced • Flexible) • Bags • Sacks • Liners • Covers
(Single and multiwall construction, using all types of material to carry, cover or protect all types of products.)

How U.S. Goods Rate Overseas

Foreign buyers generally have a high regard for American-made goods.

But they feel U. S. selling techniques could stand a lot of improvement.

▪ If you plan to market abroad what sort of reception can you expect for your products? Do overseas customers want to buy American?

The answer is a highly qualified yes. In general, foreign buyers have a high regard for U. S. goods. They respect the American reputation for ingenuity, craftsmanship, and design. They realize U. S. manufacturers are constantly working to improve their products.

Weak Sales Approach—But—and it's a large but—American sales methods overseas leave a lot to be desired. As part of the new export expansion plan, officers of American Foreign Service posts went out and interviewed importers, agents and users of U. S. products.

The results are disclosed in the U. S. Dept. of Commerce's Foreign Commerce Weekly. The overall impression from the survey: There is no lack of interest in U. S. goods. But American attitudes and methods of doing business abroad are sometimes frustrating to the foreign consumer or dealer.

Poor Relations — Here are the specific complaints: U. S. suppliers are inclined to treat their export organizations as poor relations. Sales would increase, the buyers say, if American firms would apply the same selling and marketing skills they use at home.

They should step up sales campaigns, stressing brand names, quality, novelty, and product performance. They should keep in close contact with foreign distributors and agents, reply promptly to inquiries, print sales literature and instructions in local languages, quote prices in native currency, and be willing to sell in small lots.

Too often, it's pointed out, U. S. firms use large, established commercial agents and distributors. But some products need more aggressive selling than these busy firms can supply.

Foreign buyers say American manufacturers should either visit their sales agencies more frequently, set up their own sales offices, or pick smaller agents giving them an exclusive territory, quick service, and strong backing.

Don't Quit Too Soon — U. S. firms are urged not to rule out foreign markets simply because wage scales there are so low American goods cannot compete. In many areas a product may be sold on the basis of unquestioned superiority or on its novelty. Another approach: Search the company line for products unique to the country or competitive in price in order to establish a market. Then gradually expand the line.

Other suggestions: Be more willing to extend buyers long-term credits. Take more interest in smaller-sized orders. Spend more time following through on sales and offer better servicing facilities.

Exporting Management Skills

▪ One export product from America that will continue in strong demand overseas is managerial know-how.

This is most needed in the underdeveloped countries of Asia, Africa, the Middle East, and Latin America. The export of U. S. business skill may be more important than economic aid, according to Donald K. David, vice chairman of the Ford Foundation Board of Trustees.

Different Needs—In postwar Europe, he points out, plant and equipment had been destroyed, but not technical and managerial skills. America's prime role was providing the capital and goods needed to turn these talents back to productive effort.

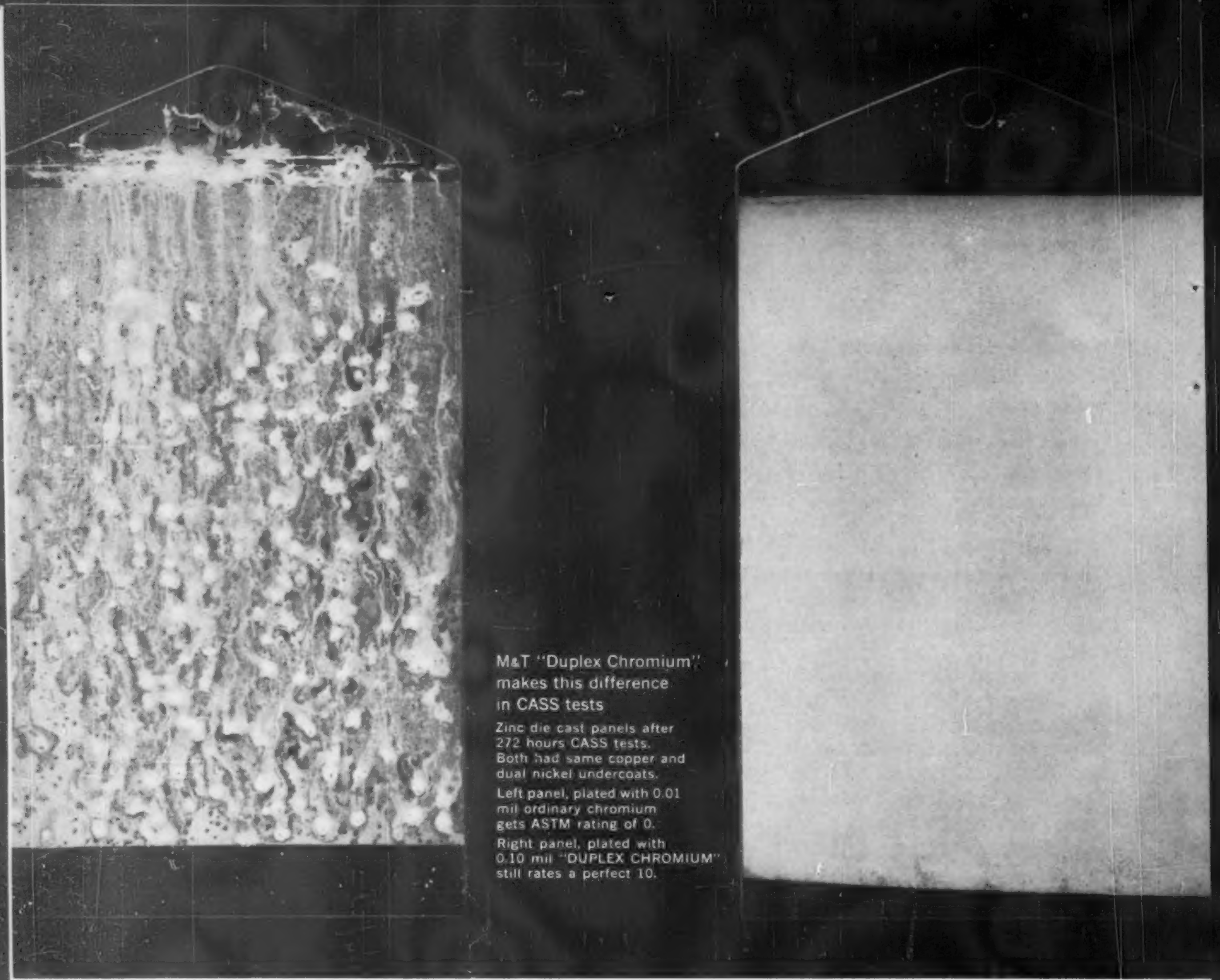
"But in other parts of the world the emphasis is entirely different," he adds. "In most of these areas, money and capital equipment will not in themselves meet their needs.

"In fact, some of them don't need capital at all, and in most of them capital is not the priority requirement. What they need most urgently is administrators, organizers, managers, and entrepreneurs. And this is precisely what our schools of business administration are designed to produce."

Construction Slid During March

Nearly every type of construction activity registered some decrease in March, the Federal Reserve Board reports.

After rising for three months, the seasonally adjusted value of new construction put in place declined to an annual rate of $52.9 billion.



M&T "Duplex Chromium" makes this difference in CASS tests

Zinc die cast panels after 272 hours CASS tests. Both had same copper and dual nickel undercoats.

Left panel, plated with 0.01 mil ordinary chromium gets ASTM rating of 0.

Right panel, plated with 0.10 mil "DUPLEX CHROMIUM" still rates a perfect 10.

The thicker the "Duplex Chromium" ...the longer the plating lasts

THE hours that plated samples survive in CASS* tests indicate the life expectancy of the parts in actual outdoor use. Results obtained with this modern, severe corrosion-testing technique prove that M&T "DUPLEX CHROMIUM" radically increases protection. They further show that the *thicker* the chromium plate the *longer* the finish lasts.

Here then is the best way to upgrade durability of decorative, chromium plated automotive and other steel and zinc die cast parts. You'll get a dramatic improvement with a thickness of 0.05 mil M&T "DUPLEX CHROMIUM." And you can provide even more remarkable service life by depositing 0.10 mil.

For plating thicker chromium, Unichrome SRHS® (self regulating high speed) Chromium baths have no equal. They alone give the right *type* of deposit. They not only speed production but also simplify it. M&T "DUPLEX CHROMIUM," using two of these baths, consists of a layer of Crack-Free Chromium topped by another special layer of SRHS® Chromium that minimizes localized corrosion due to tiny imperfections in the basis metal. The Crack-Free Chromium also assures more uniform distribution of the plating, so that recesses, too, get amply thick deposits without graying or burning on edges. Write for technical data or for an M&T plating engineer.

*Copper accelerated acetic acid salt spray test

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plating products • welding products

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METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

Wanted: More Auto Mechanics

Automakers Say There Is Dire Need for Qualified Men

The lack of qualified men to service U. S. and foreign cars is posing a threat to the industry.

As autos get more complex, there is a great need for specially trained men. — By A. E. Fleming.

- Keeping automobiles in flawless operating condition is becoming a world problem.

The problem involves purchasing power, manpower and technology. More people in more countries are buying cars. The number of persons skilled in servicing cars is falling, and the need for expert mechanics is rising as vehicles become more complex and as new and greater varieties of engines, transmissions and suspensions arrive.

Negligence Costs—Estimates are U. S. car owners alone lose $200 million a year by neglecting their cars. The total represents half the difference between the high and low values of cars traded on new models. But the problem may be one of inadequate service facilities and personnel as well as neglect on the part of owners. Automakers recognize this.

As the world market grows, as export markets broaden, the service dilemma will grow more intense. Some foreign car sellers in the U. S. know this. They are already facing the wrath of American car buyers who are critical of long waits for parts shipments from overseas ports.

Success or Failure—Sizing up the situation, an official of one of Europe's most successful auto builders says the success of car makers in solving the problem of service will largely govern the success or failure of their products from now on. He calls service the major problem facing today's automobile marketing.

This is the belief of R. E. Valode, vice president and general manager of Renault, Inc. His company's operating credo reflects this belief. It is: A car that's sold everywhere must be repairable everywhere, and within the shortest possible time. Engineers must take this problem into consideration when designing a car.

New Motive—Mr. Valode says as soon as a new market is to be exploited — whether in Alaska, French Guiana or the Canary Islands—spare parts must be stocked fully before the cars are distributed. "As far as the customer is concerned," he says, "the snob motive for buying a new model has given place to another motive: That of being sure the car can be and will be rapidly and economically serviced."

According to Mr. Valode, car manufacturers must take every precaution to see that mechanics in every country their cars are sold are properly instructed in repair methods and servicing. This also requires the creation of technical literature published in the language of all the countries concerned. Another factor is setting up permanent schools and mobile training

CLASSROOM: Auto trainees study transmissions at Chrysler Corp.'s regional training center at Rye, N. Y. Center is operated to help keep dealer service personnel abreast of latest automaking developments.

units for instructing technical personnel at all levels.

School Scene—Operation of service training schools is becoming a major part of the automotive scene in the U. S.

Chrysler Corp. regularly holds training sessions at dealerships and in six training centers around the country. The centers handled almost 8000 service managers and technicians in 1959. Dealers came for instruction from Norway, Pakistan, India, South Africa, Australia, Canada, Peru and Mexico.

General Motors Corp. has 30 centers around the U. S. with full-time instructors. GM car and truck dealers had over 115,000 class registrations for auto mechanics in 1959. Auto service and repair schooling alone totaled some 1,875,000 hours last year. High school and vocational school teachers are invited each summer to attend classes dealing with the latest automotive repair.

Fast Pace—"There's a growing need for expertly trained auto mechanics and other service technicians," says Myrle St. Aubin, director of GM's Service Section. "Rapid technological advance and an exploding motor vehicle population require quality service on an ever-expanding scale."

An American Motors Corp. executive is in complete agreement. J. N. Demers, supervisor of mobile training units of AM's Service Dept., traces the shortage of mechanics, in part, to misconceptions of young people who might otherwise adopt the profession.

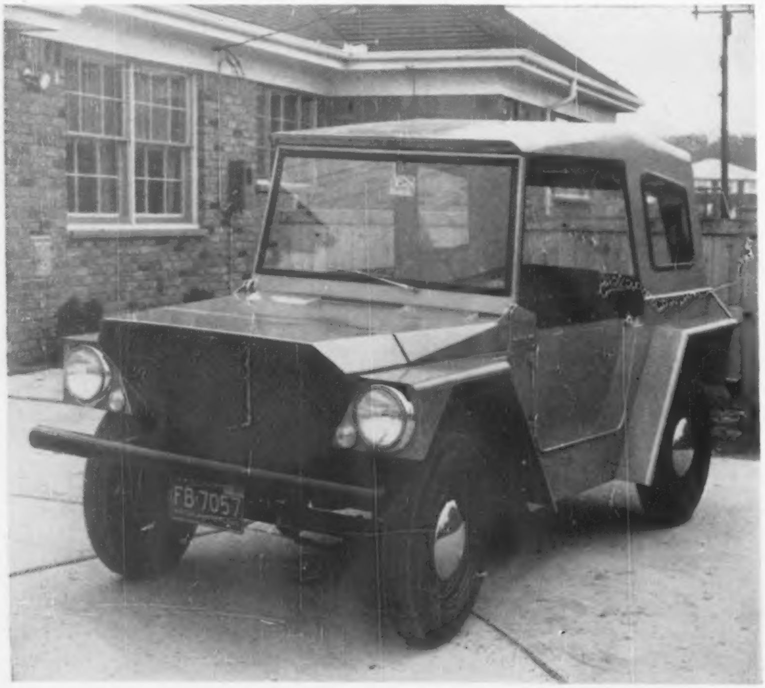
Gone are the Days—In recent years, the auto mechanics profession has been looked on as low in social prestige. U. S. car makers are trying to correct this. "The prestige of a good mechanic is rising to the point where it should be," he says. "Gone are the days of the dingy back-alley shop and the grease-monkey.

"Today's car repairmen must be highly skilled technicians capable of keeping abreast of the many advances in the auto industry," he says. "No longer can he do a job with a wrench and a guess. Today he has modern testing equipment, special tools, excellent and detailed service manuals and clean, spacious working conditions. That's why we prefer the term 'service technicians' instead of 'mechanics.'"

Sparce Numbers—There's a great deal of opportunity in the field, too, says Mr. Demers. "With the acute shortage of skilled men it's not difficult for a well-trained person to become a department manager."

But there aren't enough mechanics around. He estimates the domestic auto industry currently needs an additional 150,000 mechanics. Other estimates run as high as 600,000, and indicate the ratio of vehicles to capable mechanics in the U. S. is almost 100 to 1, and growing. The ideal ratio is said to be 60 to 1.

New Utility Car Hits Market



SCAT-ABOUT: The new Saviano Scat, a two door, four-passenger vehicle designed for sportsmen and industry is being made by Saviano Vehicles of Warren, Mich. It sells for $1390, including handling and Federal excise tax. It is designed for both heavy duty work and pleasure.

Chrysler Plans Another Compact

During the company's annual shareholders meeting, L. L. Colbert, Chrysler Corp. president, officially revealed that a new compact car has been developed for marketing by Dodge dealers as a 1961 model. Although no details were released, the model has been a topic of discussion in Detroit for several months (The IRON AGE, Feb. 18, P. 83 and April 21, P. 121).

Steady Climb—Mr. Colbert said sales of Chrysler-built passenger cars have climbed steadily since the first of the year from 14.4 pct of the market to 16.1 pct in March. He said the company was "definitely in the black" in the first quarter of 1960. A report on first quarter earnings will be made April 28.

During the first three months of 1960, combined sales of the Plymouth, Valiant and Dodge Dart accounted for 12.3 pct of the market.

A Tractor with Guts and Integrity!

In any piece of equipment there are vitally important components and engineering developments not apparent to the eye. Only after years of hard and strenuous use, does their strength or weakness become apparent . . . and inscribe itself on your profit and loss statement!

One of the important features of the modern Eimco line of crawler-tractors is the broad use of heat treated alloy steels, for greater strength and resistance to metal fatigue. Instead of using cheaper iron castings, Eimco produces highest quality, carefully controlled steel in its own electric furnaces, under highly skilled metallurgists.

In an Eimco, the track shoes, sprockets, idlers, track rollers and equalizer bars are all produced in Eimco's vast and modern plants from heat-treated cast alloy steels, and other components from special steels, tailor-made by Eimco for their particular end-uses. One of the results has been a record of over seventy per cent savings on maintenance and parts costs by Eimco operators, as against the average for any other leading make of crawler-tractors!

You can easily see many of the Eimco exclusives, such as Up-front Operator Position; "Unidrive" transmission at work, for flip-of-the-lever shifting, forward or reverse; Dual Final Drives for maximum maneuverability and true spin turns and others.

But remember, under these unique and important features, is the heart . . . the guts . . . of any tractor. The integrity, quality and craftsmanship of the manufacturer. Eimco's are built to a standard that permits a full year guarantee on the entire tractor and transmission.

So step up your work output . . . and profit . . . with the modern and efficient line of crawler-tractors.

Eimco 103
100 H.P. DIESEL

Eimco 105
143 H.P. DIESEL

Eimco 106
205 H.P. DIESEL

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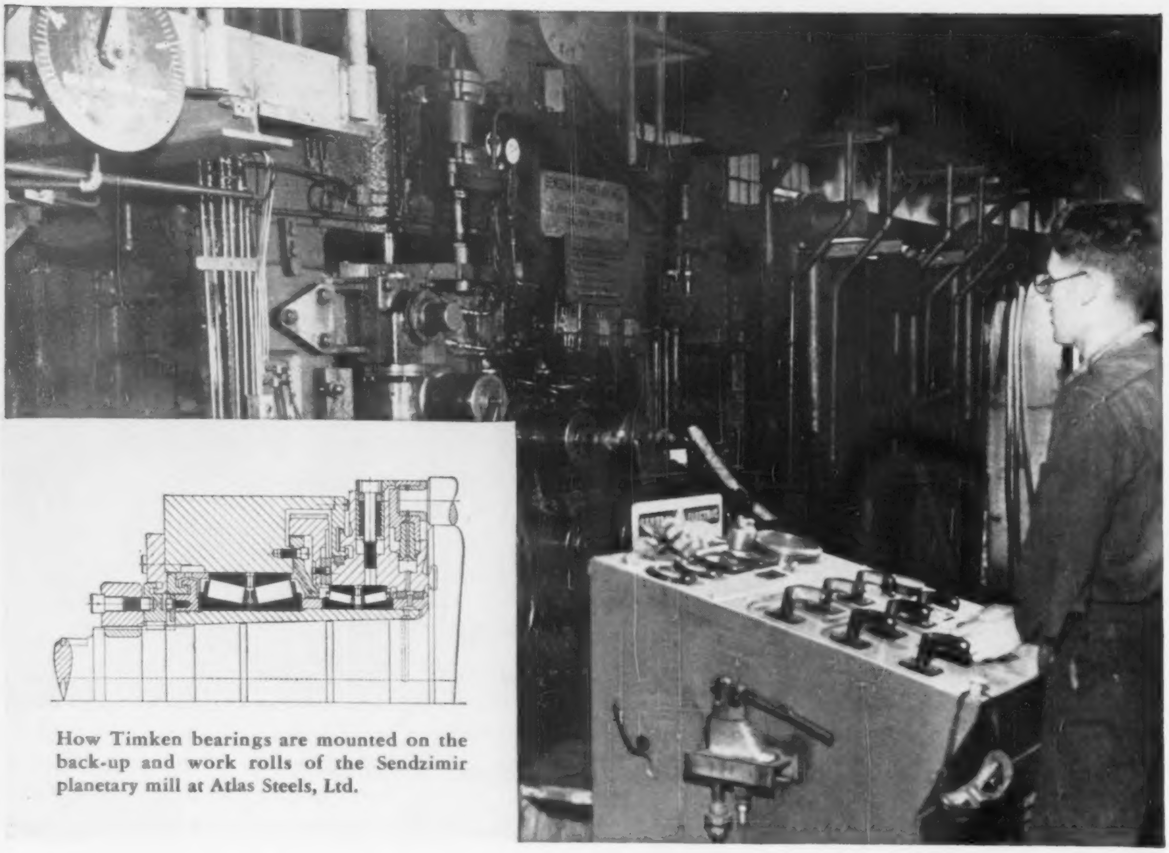


How Timken bearings are mounted on the back-up and work rolls of the Sendzimir planetary mill at Atlas Steels, Ltd.

Unique mill reduces slabs from 2¼" to ⅛" thickness in one pass . . . Timken® bearings take the shock

THE only machine of its kind in production in North America, this Sendzimir Planetary Hot Rolling Mill at Atlas Steels, Ltd., Welland, Ontario, makes only one pass to reduce slabs from 2¼" thick x 20" maximum width to ⅛" thick x 20" wide. Based on a new concept of rolling hot strip, it required many mechanical features not found in conventional mills. And to take the heavy shocks, keep bearing cost down, feed rolls, work roll cages, and back-up rolls are mounted on Timken® tapered roller bearings.

1008 mills of all types throughout the world depend on Timken bearings for economical operation. Here's why:

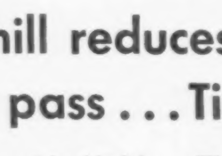
1) *Balanced Proportion Design* of Timken bearings provides the optimum combination of bearing capacity, rigidity and roll neck strength. Load ratings are increased up to 40%. And their tapered design enables Timken bearings to take both radial and thrust loads.

2) *Longer life.* Tonnage records show that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled to a bare minimum.

3) *Closer, more uniform gauge* in products rolled because Timken bearings positively locate mill rolls. And the low starting friction gives better product finish, cuts scrap losses, and results in higher mill speed.

4) *Economical lubrication.* Timken bearings permit simple grease lubrication and operate efficiently with the new oil mist systems.

For better new or existing rolling mill equipment, specify Timken tapered roller bearings. They help machines do better work. That's BETTER-ness. And its symbol is the trade-mark "TIMKEN". Look for it. **When you buy Timken bearings you get . . .**
1) Quality you can take for granted.
2) Service you can't get anywhere else.
3) The best-known name in bearings.
4) The pace setter in lower bearing costs. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Canadian Division: Canadian Timken, St. Thomas, Ontario. *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

Elections Spur Pump Priming

Summer Promises Government Pep-Up of Economy

Lagging sales and payrolls are casting too big a shadow across election year.

Defense spending step-up, distressed areas aid, and fatter farm subsidies due.—By G. H. Baker.

▪ Don't underestimate the government's ability to perk up the U. S. economy in the months ahead.

The Administration has no intention of heading into the November elections with sales and payrolls bumping along in low gear. The White House even now is drafting plans for stepping up activity this summer in defense spending, in aid to distressed areas, and in fatter farm subsidies.

Hot Debate—Whether or not the government should or should not have the power to speed the economy up or slow it down is still a hotly-debated point. But the fact remains that the Executive Branch does possess this weapon, and every national administration in the past 28 years has used it to the fullest permissible extent in election years.

Interest Rates—Besides its ability to speed the flow of government spending, the White House also is now debating—privately—whether to peg interest rates downward to stimulate borrowing for business expansion, for new construction, for inventories, and for general business and industrial purposes.

Pep-up Due—It is now certain that the Administration plans to pep up the economy, starting early in the third quarter.

Only questions remaining: How potent will be the remedies? How much inflation will result from these injections?

Imports Invade Government Contracts

Foreign competition for U. S. government contracts is a tough nut for American businessmen to crack. This was pointed up once again when a Japanese firm underbid an American company by almost $1 million on an Army contract for Panama Canal locomotives.

A U. S. firm's only recourse is the "Buy American" policy of the government. This would give the domestic company the order only if it is found the award of the contract to the domestic company would be in the interests of national security.

In the Panama Canal locomotives case, the Army has asked the Office of Civil and Defense Mobilization to rule whether the Fate-Root-Heath Co., Plymouth, Ohio, or the Japanese firm of Mitsubishi Shoji Kaisha, Ltd., should get the job.

The Ohio firm bid $4.7 million for the job. The Japanese company bid $3.8 million.

Congress Looks for More Space Money

Chances are now good that the Congress will approve all the $1 billion the White House is asking for space study in the new fiscal year.

Democratic leaders are determined not to be painted into a corner by talk of trimming the space-study budget, however. Since many Democratic presidential candidates are insisting the Administration's space-study efforts are "too little and too late," it would be folly to then vote further budget cuts, it is pointed out.

Depressed Area Aid Sought

▪ Congressmen from depressed areas are pushing hard for government aid money this year.

Rebuffed by the White House in their fight for an election-year boost to the sagging economies of labor-surplus areas, they are now grimly staging an all-out fight for a $250 million assist from Washington.

Senate OK—The Senate has already given its approval to a bill calling for $250 million worth of redevelopment in the new fiscal year, which starts July 1.

The House, like the Eisenhower Administration, boggles at this sum. House members believe about $100 million would be enough.

Job Imbalance — Many House members fear so-called depressed areas will became permanent wards of the government if Washington relief continues on a large scale. They point out that many unemployed persons in labor-surplus areas are needed in jobs in other sections of the nation.

In an election year, some form of relief shapes up as a strong prospect, although the $250 million figure probably will be cut somewhat.

Anaconda Memo to Management

Maybe zirconium copper wire is your answer

Looks like ordinary wire, but it's new and rather special. Amzirc®—zirconium copper, Cu 99.88%, Zr .12%—combines high electrical conductivity (90 to 95% IACS at room temperature) and strength retention at elevated temperature in the aged condition. Tensile strength of zirconium copper cold worked 80% and aged is about 70,000 psi at 20 C—52,000 psi at 400 C in a short-time test. Naturally, it has attracted interest in the missile field. We just recently finished drawing a batch of .0179" wire for testing as a conductor in some missile components, and now know that even smaller diameters can be made. We also know it has excellent hot- and cold-working characteristics. But we don't have all the answers yet—nor does anyone else. The reason we call it to your attention is that you may have a problem that won't wait until we can OK it as a completely proven product. Possibly we could work together in finding the answer. Our Metallurgical Department and mills are working with many copper alloys offering a variety of unusual property combinations. The answer might be Amzirc—or *Cunisil-837*, our copper-nickel-silicon alloy—or *Chromium Copper-999*—or *Leaded Nickel Copper-831*. All have a potential for special electrical applications.

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If you are looking for metals to do new jobs—or to do present jobs better—tell us the combinations of properties you need. Call in your American Brass Company representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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Shipbuilders Expect More Sales

New Construction Jobs Increase in Farwest

West Coast shipyards are encouraged by a large navy contract and more freighter work.

Pattern of the industry changes as Lockheed, Boeing, Kaiser and others buy facilities.

—By R. R. Kay.

▪ Shipbuilding on the West Coast is struggling hard to gain ground. The industry never did get over its post-World War II nosedive. Now, however, hopeful signs are showing up.

The yards have 15 freighters on the ways. That's the most new construction they've had in years.

Big corporations are getting into the picture. This means new money for better equipment and facilities.

New Developments — Some recent moves include:

Lockheed Aircraft's purchase of Puget Sound Bridge and Dry Dock Co., Washington. Plans call for research and design work on advanced hulls and hydrofoils.

Sale of National Steel and Shipbuilding Co., San Diego, to a group headed by Kaiser Industries.

Purchase of a mothballed Navy yard in Everett, Wash., by another group: Scott Paper Co., Western Gear Corp., and Pacific Towboat Co.

Boeing Airplane Co., Seattle, may get into shipbuilding on its own. The firm is interested in building hydrofoil boats.

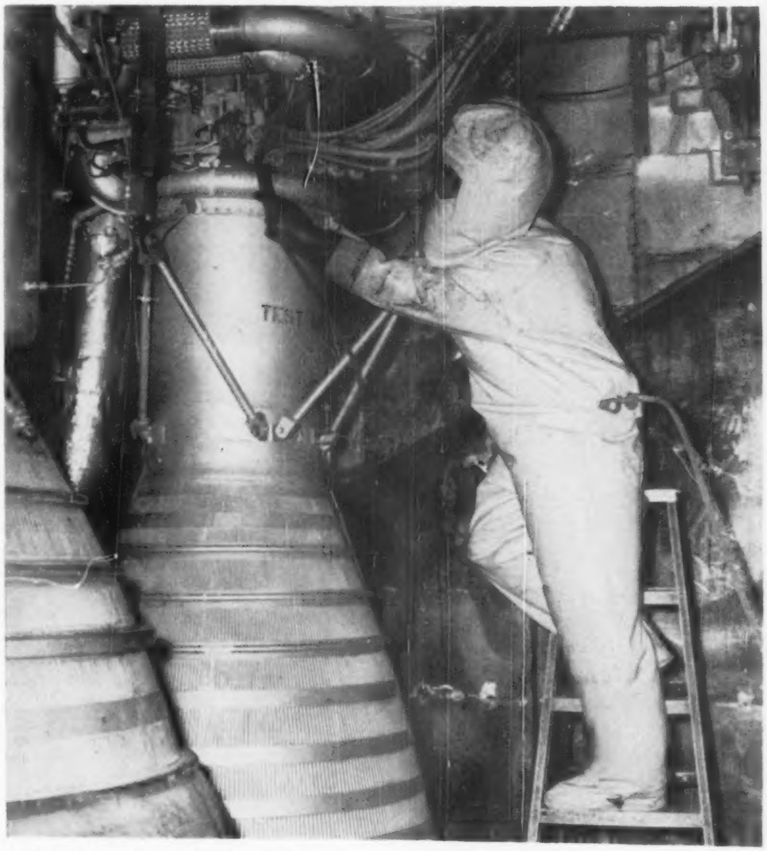
Puget Sound Revival—In fact, the Puget Sound shipbuilding area seems headed for a revival. Puget Sound Bridge and Dry Dock landed a $47 million contract for three guided missile destroyers. That's the Navy's biggest peacetime award in the area. And there are hints of more work to come.

IRON AGE Interview—In California, new private and government shipbuilding is "both good and bad." That's the estimate from Jerry M. Ets-Hokin, chairman of Gov. Edmund G. Brown's committee on shipbuilding construction and repair.

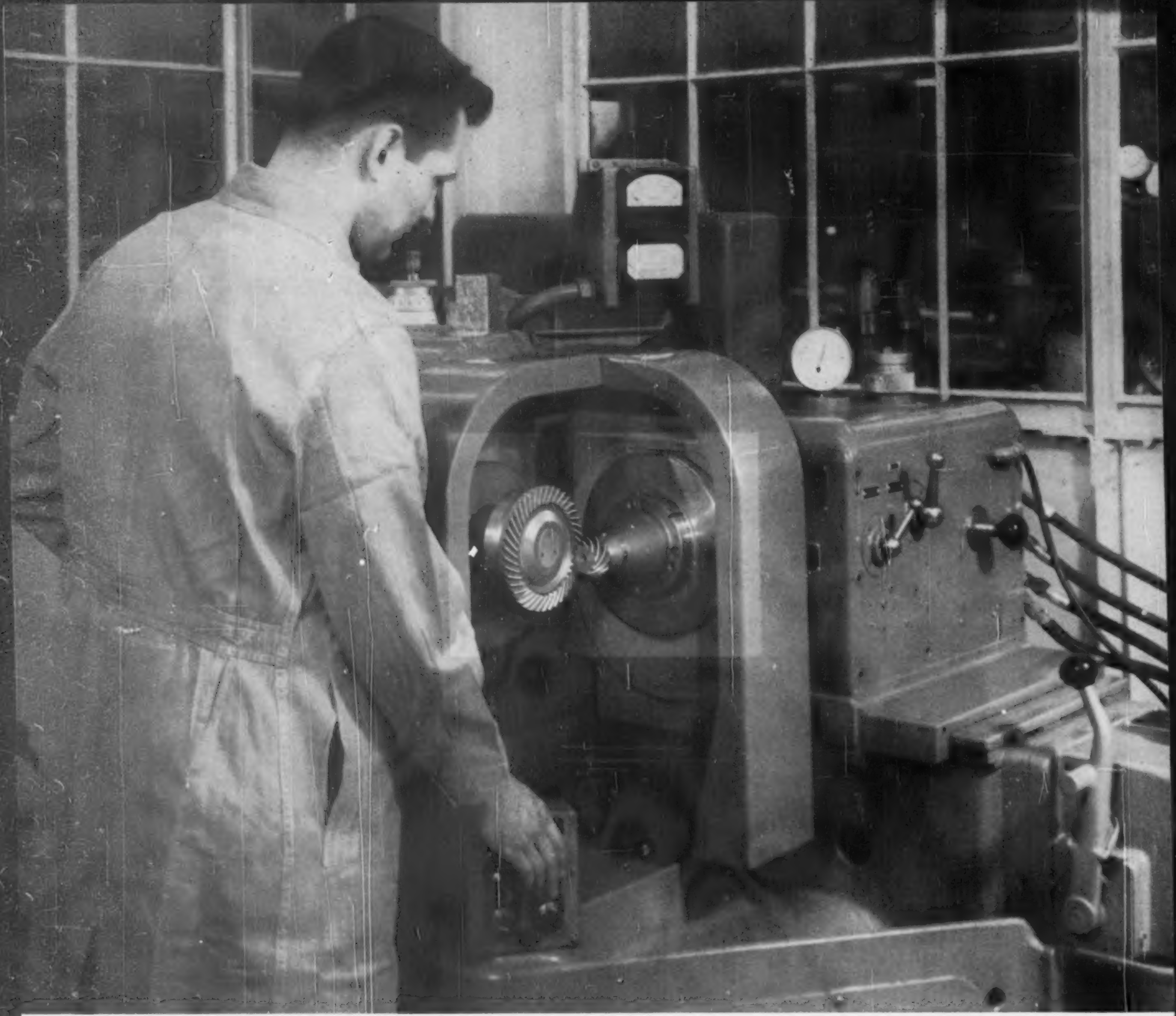
In an exclusive IRON AGE interview, Mr. Ets-Hokin said, "It's promising from the standpoint of the ability of West Coast yards to participate in the Maritime Administration Program.

"West Coast yards already brought in $100 million of such work in the past year. Part of this was without the 6 pct differential. This shows West Coast yards can compete without the differential."

Heat Goes On in Rocket Engine Test



ENGINE FOR ATLAS: Worker wears special pressure suit during high temperature test of multiple rocket engine for new MA-3 Atlas ICBM. Engine was produced by Rocketdyne Div. of North American Aviation.



Now you can *speed-test* gears up to 4000 RPM

Since the accuracy of any gear test depends on how well it simulates actual operating conditions, we've developed a hypoid tester with speeds up to 4000 RPM. The higher range of speed on the No. 17A-4000 Hypoid Tester makes possible a new standard in the testing of bevel gears.

Complete testing on one machine. The No. 17A-4000 Hypoid Tester is arranged for both power and slow rolling tests. With the power test you can observe a gear's smoothness of operation, its noise characteristics, and its tooth contact pattern.

Roll test the gear and you get accurate readings of its eccentricity, tooth size, spacing, and profile.

With the No. 17A-4000 Tester you can test any right angle straight bevel, Zerol® bevel, spiral bevel and hypoid gear of any pitch and up to 20″ OD.

Pre-set backlash control. The No. 17A-4000 Tester has a new hydraulic backlash control mechanism. The control automatically duplicates your pre-set backlash value when you change the relative positions of a gear pair to simulate actual operation.

Exact duplication of settings. Indicator set-up fixtures are available for large quantity testing. With these gages you can make identical settings on a battery of machines, or get the same setting repeatedly on a single machine.

New bulletin. We've prepared a bulletin on the No. 17A-4000 Hypoid Tester to answer any questions you might have about its construction or operation. Write for a copy.

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Turn Import Trend Into Sales

Tool Distributors Are Told It Can Be Done

U. S. machine tool industry can turn the trend toward import products into sales.

To do so, it must convince U. S. industries to modernize equipment.—By R. H. Eshelman.

▪ The influx of foreign products into the U. S. doesn't have to be a cause of gloom. It can be turned into sales opportunity for U. S. machine tool builders, claims A. C. Mattison, president of the National Machine Tool Builders Assn. and of Mattison Machine Works, Rockford, Ill.

He says, "The metalworking industry of the United States is . . . not in very good shape as to production equipment."

Why? Thousands of machine tools still in use are 10 or more years old. They were built to designs that have long since become obsolete. And these older machines, which form the bulk of the machine tools in use, are costly to operate in comparison with modern tools.

Selling Job—"Our job is to convince the metalworking manufacturers of the U. S. to modernize, on behalf of survival . . . and to meet the threat of foreign competition. We may launch . . . an industrial revolution," he told members of the American Machine Tool Distributors' Assn. spring meeting last week.

Some specifics advocated by Mr. Mattison are:

1. Get customers to visit the machine tool Exposition next September.

2. Show top executives the extent to which they can get more output per hour at lower cost.

3. Overhaul distributor sales organizations with compensation related to performance, including incentives, penalties, and quotas.

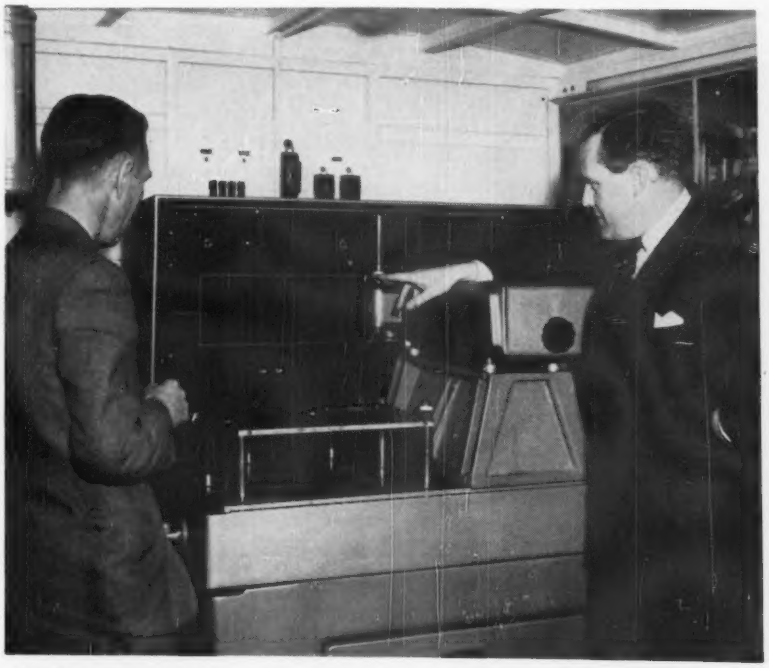
4. Salesmen should average 4.5 calls a day.

What It Takes—"I wonder sometimes if all of you realize how serious this (import) situation is?" Mr. Mattison asked. "This isn't like the days of Korea when orders dropped off the trees like plums. It is going to take real selling today—not because the market isn't there, but because customers may be under the illusion that they can get the same thing from abroad for less money. You and I know that in most cases that's not true. But how are our customers going to know all that unless we are on our toes pushing the actual facts right under their noses."

Mr. Mattison also emphasized that U. S. machine tool plants going abroad are to compete in markets there, not shift away U. S. capacity. He added that West Germany in 1958 made more machine tools than the U. S., that foreign tools pay 15 pct tariff and still sell at 33 pct less than American-built units.

The answer, he maintains, is to out-design foreign tools and regain tighter control over costs.

Get Fast, Accurate Dimension Checks



QUICK CHECK: New parts inspection machine uses optical grating and manual probe for dimension check to 5 decimal places. The machine, developed by Ferranti, Ltd., will be marketed by Bendix Aviation Corp.

INDUSTRIAL BRIEFS

Medal for Evans—Dr. P. R. V. Evans has received the Carnegie Silver Medal for 1959 from the Iron and Steel Institute of Britain. He is physical metallurgist at the Armour Research Foundation of Illinois Institute of Technology. The award was given for research he did on the effect warm rolling has on high-carbon steel.

Uncommonly Good — Precision stainless steel strip and foil made by Rodney Metals, Inc., New Bedford, Mass., will be distributed in western states by Ducommun Metals & Supply Co., Los Angeles. Territory includes California, Washington, Oregon, Arizona, New Mexico, Idaho and Utah.

New Aluminum Mill—Fairmont Aluminum Co., Fairmont, W. Va., is installing one of the largest aluminum rolling mills in the world. The 35-year-old producer of sheet, roll and aluminum strip merged with its parent firm Cerro de Pasco Corp., New York, two years ago and has been expanding since.

Tax Asset — Mobile incinerators made by United States Incinerator Co., Boston, will soon be distributed nationally. Distributors have been set up in 14 states. Sales have been increasing steadily since the units are not taxed as real estate and get a fast tax write-off.

Beryllium Tube Agent—Superior Tube Co., Norristown, Pa., has been appointed agent in the U. S. to supply pure beryllium tubing under agreement with Chesterfield Tube Co., England. Both companies have agreed to exchange technical information on production and applications. Superior also contemplates production of beryllium tubing in this country.

316L Weld Metal—Welding Research Council is investigating reports of weld corrosion of this stainless, as welded. If you have a case to report, write WRC, 1500 S. 50th St., Philadelphia 42. They'll contact you for more data.

More Welding Wire — Arcwire Corp. is enlarging its Mt. Carmel, Pa., plant to supply the needs for welding wire. Arcwire, a subsidiary of the Arcos Corp., Philadelphia, draws welding quality stainless steel and aluminum wire.

Refractory Production — Kaiser Refractories & Chemicals' new periclase plant has been opened at Midland, Mich. The plant has the capacity to produce 45,000 tons of periclase and refractory grade magnesias a year. The new $3 million plant represents the fifth major expansion by Kaiser of its basic refractories operations in 5 years.

Award for Design — Mr. Jean Tschumi, noted Swiss professor of architecture, has been selected to receive the 1960 Reynolds Memorial Award. Professor Tschumi was picked for his design of the Nestle's International Headquarters building located in Vevey, Switzerland. The $25,000 Award is conferred annually by the American Institute of Architects.

Acoustica Expands — Acoustica Associates, Inc., has expanded its plant space in Los Angeles and Garfield, N. J. It expects to show greater earnings on sales of $7.7 million for its fiscal year ended Feb. 29, 1960, as compared to 1959 sales of $4.8 million. Acoustica has produced over $10 million worth of ultrasonic propellant control systems for ballistic missiles.

"This talk about billions for defense is nonsense — we've got to think big!"

Detroit Relocation—The Simonds Worden White Co. has opened new facilities to house its district sales offices in Detroit. Located at 14885 Meyers Rd., the building contains sales offices for the Dayton Safety Grinding Wheel and Machine Knife Divisions. Former offices were on Grand River Blvd.

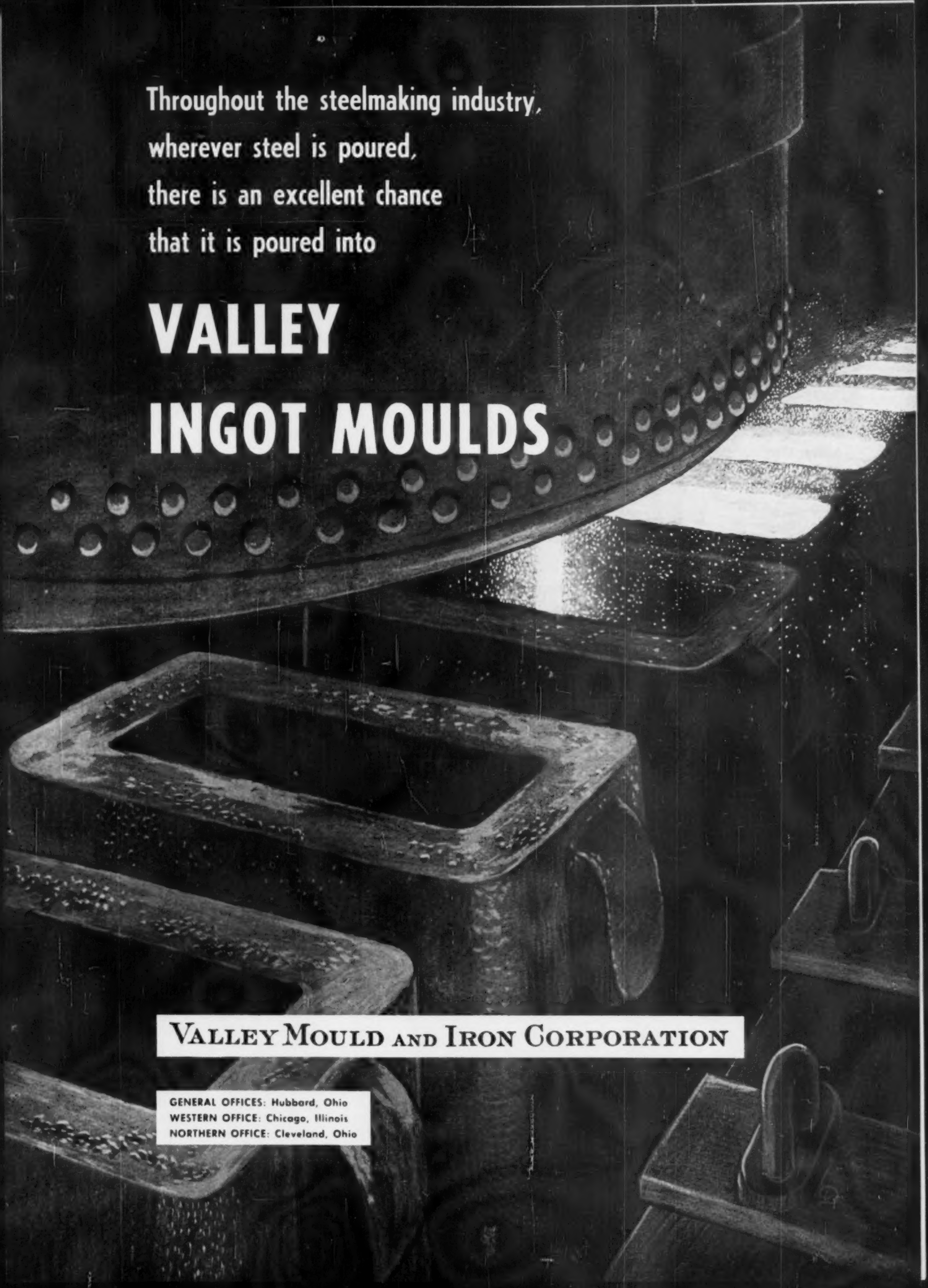
Big Dipper—A dip tank for polyvinyl chloride coating pieces 20 ft long and 6 ft. in diam has been installed by Quelor, Inc., Chester, Pa. Said to be the world's largest of its type, it will apply coatings of almost any desired thickness.

Joining Up—The Detroit Powder Metallurgy Society has been elected to become formally affiliated with The American Powder Metallurgy Institute as a local section. The Society had been an independent organization since its founding in 1954. The Institute is the technical division of the Metal Powder Industries Federation.

Move in the West—E. F. Houghton & Co. has opened a new plant at 54 Tanforan Ave., South San Francisco. Industrial oils and chemicals formerly manufactured at Houghton's plant on Davidson Ave. are now being supplied from the new facility. The new plant has an office building, control lab and outdoor storage area.

Gear Laboratory — National Broach & Machine Co., Detroit, has set up a new computer laboratory within its engineering department. The laboratory has been installed to meet the needs for high-quality, accurate gears of maximum load-carrying capacity.

Aluminum Barges — Two large aluminum barges for transport of sensitive liquid chemicals will be built by Reynolds Metals Co. for operation by National Marine Service of New York. The first barge, which will be 130 ft long, 50 ft wide, and 12 ft deep, will be used on the Mississippi-Ohio River systems for shipments from Texas ports to Chicago and other midwestern cities. Plans for the second barge have not yet been announced.



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that it is poured into

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VALLEY MOULD AND IRON CORPORATION

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NORTHERN OFFICE: Cleveland, Ohio

MEN IN METALWORKING

Arthur Carlson, elected vice president, production, A. Finkl & Sons Co., Chicago.

Van Straaten Chemical Co.—**R. E. Wolff,** elected vice president, marketing.

Forest City Foundries Co.—**C. F. Seelbach, Jr.,** elected president and general manager.

Chicago Bridge & Iron Co.—**E. S. Fraser,** elected vice president, manufacturing.

Sargent Engineering Corp. — **R. F. Cooper,** appointed vice president, engineering.

Byron Jackson Div., Borg-Warner Corp.—**H. B. Bruwelheide,** named controller and treasurer.

Tube City Iron & Metal Co., Non-Ferrous and Nickel Alloy Div. —**A. J. Wein,** appointed vice president.

Midland-Ross Corp. — **W. H. Dickinson,** appointed a vice president of the company and general manager, Owosso (Mich.) Div.; **D. E. Walbert,** promoted to group vice president, Owosso, Cleveland, Ross Engineering, Waldron - Hartig and Ross Engineering of Canada Ltd., divisions.

Air Reduction Sales Co.—**J. M. Crockett,** appointed vice president, gases.

Pittsburgh Plate Glass Co.—**D. J. Hess,** appointed manager, industrial relations, Pacific Coast Operations.

Heppenstall Co.—**George Lawrence,** appointed superintendent, New Brighton, Pa., plant.

Wallace Barnes Div., Associated Spring Corp. — **Emil Stange,** becomes supervisor, merchandising section; **John Leone,** promoted to foreman, Compression Spring Dept.; and **A. E. Fasulo,** promoted to chief tool engineer.

Wear-Ever Aluminum, Inc.—**J. H. Hayes,** named treasurer, and **G. T. Smith,** named asst. treasurer.

H. A. Waddell, elected vice president, Gisholt Machine Co., Madison, Wis.

Sheffield Div., Armco Steel Corp. —**C. F. Rickel,** appointed general traffic manager.

The Colorado Fuel & Iron Corp., Eastern Div. — **E. F. Lord,** appointed asst. general manager, sales.

Boston Gear Works Div., The Murray Co. of Texas, Inc.—**W. R. Kunkel,** named general manager; and **R. G. Emerson, Jr.,** named asst., general manager.

Datamatic Div., Minneapolis-Honeywell Regulator Co.—**H. F. Mitchell, Jr.,** appointed a regional systems sales manager, New York City sales offices.

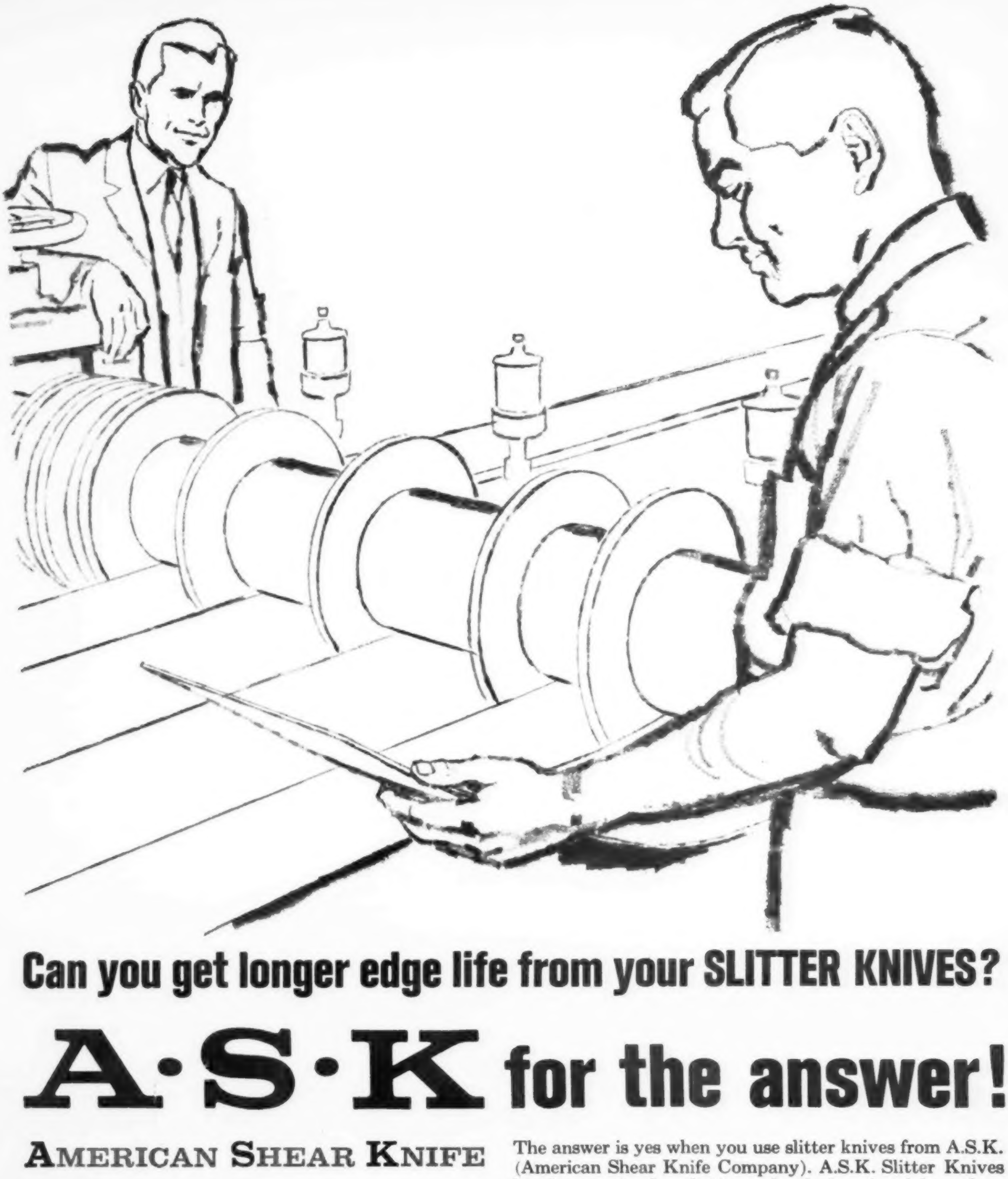
Tube Distributors Co., Inc—**Norman Altman,** named general

(Continued on P. 96)

R. H. Bruce, appointed vice president, sales, Gisholt Machine Co., Madison, Wis.

E. R. Cross, elected president, Tubular Rivet & Stud Co., Quincy, Mass.

W. R. Carmichael, named vice president, Tubular Rivet & Stud Co., Quincy, Mass.



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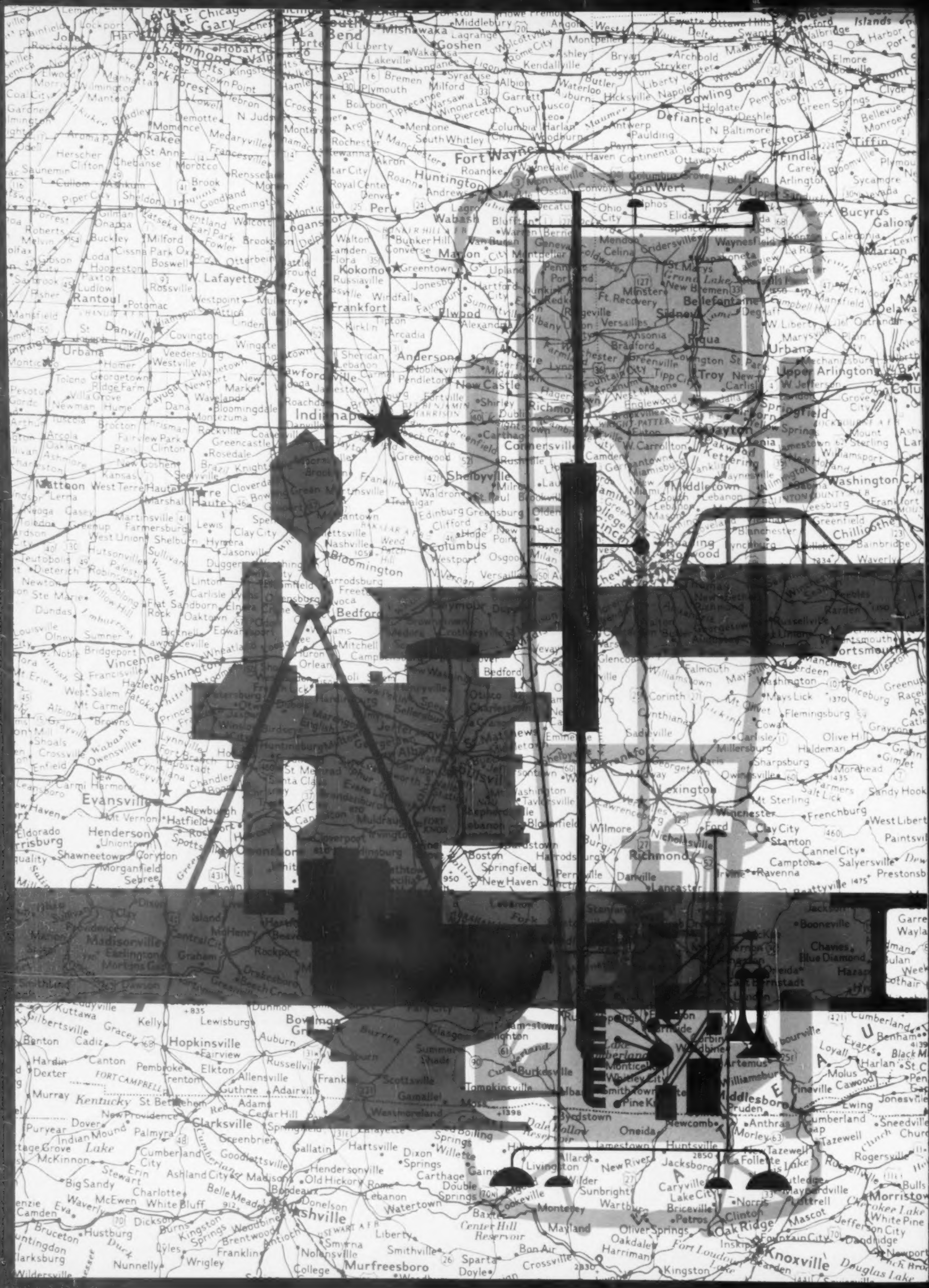
AMERICAN SHEAR KNIFE

The answer is yes when you use slitter knives from A.S.K. (American Shear Knife Company). A.S.K. Slitter Knives last longer, stand up better under the heaviest jobs, reduce maintenance and replacement costs!

Why? Because A.S.K. has devoted years of research to the selection of proper alloys, and correct techniques in heat treating, precision grinding. For slitter knives that last longer, improve your slitting operation . . . Ask A.S.K.!

FREE HANDBOOK—Want a handy reference on the installation, operation and maintenance of slitter, shear and chipper knives? A.S.K. has the answers in an 88-page manual. For free copy, write American Shear Knife Co., Homestead, Pa.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Goshen
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Fort Wayne
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Logansport
Kokomo
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Bowling Green
Clarksville
Nashville
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Findlay
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Portsmouth
Lexington
Richmond
Frankfort
Middlesboro
Knoxville
Oak Ridge
Kentucky

(ONE OF A SERIES DEPICTING MARKET AREAS SERVED BY INLAND)

INLAND STEEL IS

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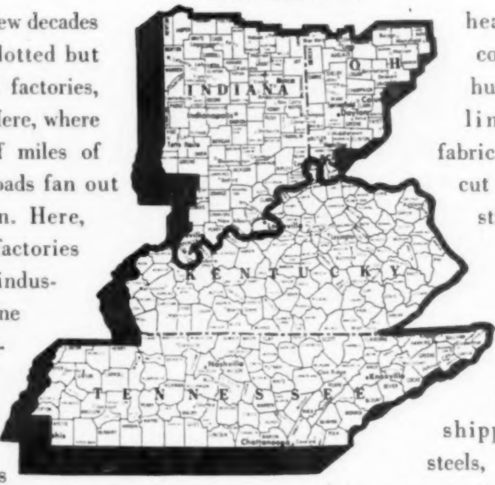

Here, where only a few decades ago the land was dotted but sparsely with small factories, forges, tool shops. Here, where today thousands of miles of highways and railroads fan out in every direction. Here, where today giant factories feed the nation's industries with the machine tools, the components, the finished parts with and from which millions upon millions of wanted products are formed.

This is the crossroads of American Industry . . . and here, Inland serves.

This is a territory teeming with life, with creative activity, with bright plans for the future. It spreads across the length and breadth of Indiana and Tennessee—takes in the explosively productive central and western areas of Ohio—and Kentucky. This is a territory that gives to the nation, great political leaders, famous writers, artists, poets, educators.

From this land and the hands of its people come the products of steel—the gleaming lathes, drill presses, grinders, machine tools, that make our country the bulwark of the Free World. Out of its factories come the steel truck and car bodies, the ignition systems, radios, headlights, horns, heaters, exhaust systems—countless components for the hungry automobile assembly lines. Here, builders and fabricators take steel—bend it, cut it, shape it into the forms, structurals, tanks, girders for the nation's building and construction industries.

Here, years ago, Indiana Harbor Works of Inland Steel Company shipped its first orders of steels, among them the products of its new continuous sheet mill, one of the first modern mills in America. Throughout the years, Inland continued to serve and in serving learned the needs of this amazingly diverse territory—adjusted its steelmaking to the practices of its manufacturers.

Today, Inland accepts as a major goal—ever expanding service to the builders and manufacturers of this constantly developing territory. Inland is here, and here to stay. For *here* . . . is Inland's future.

INLAND STEEL COMPANY

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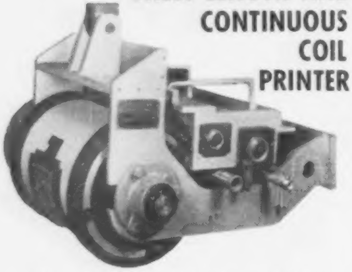

For line or friction drive continuous marking . . . or electronic control for spot printing.

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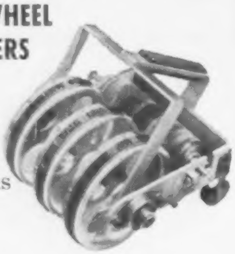
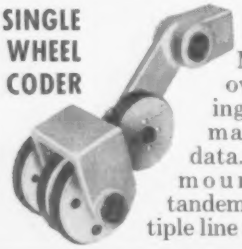


Hand rollers or in-line units for continuous overall sheet marking

SINGLE WHEEL CODER



Mounted over moving stock to mark code data. Can be mounted in tandem for multiple line marking.

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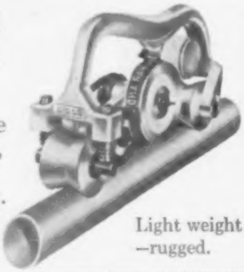

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(Continued from P. 92)

sales manager; **E. A. Raymond,** appointed general manager, Western Div.; **H. K. Welsh,** appointed asst. general sales manager.

Westinghouse Electric Corp.—**W. G. Evans,** appointed project manager, thermoelectric program.

Eugene Makie, appointed vice president, manufacturing, National Automatic Tool Co., Richmond, Ind.

Unit Drop Forge Div., Fuller Mfg. Co.—**F. M. Weinhold, Jr.,** promoted to general manager; **G. J. Houting,** promoted to asst. manager; and **E. J. Wink,** to purchasing agent.

Aluminum Co. of America—**W. H. Derry,** appointed asst. manager, Seattle district sales office.

The Stanley Chemical Co.—**W. G. West,** appointed sales manager.

E. V. Rankin, appointed vice president, Boston Gear Works Div., The Murray Co. of Texas, Inc.

M. G. Armentrout, named vice president, marketing, Wear-Ever Aluminum, Inc.

McGraw-Edison Co., Coolerator Div.—**R. F. Knudson,** appointed chief engineer, heating products.

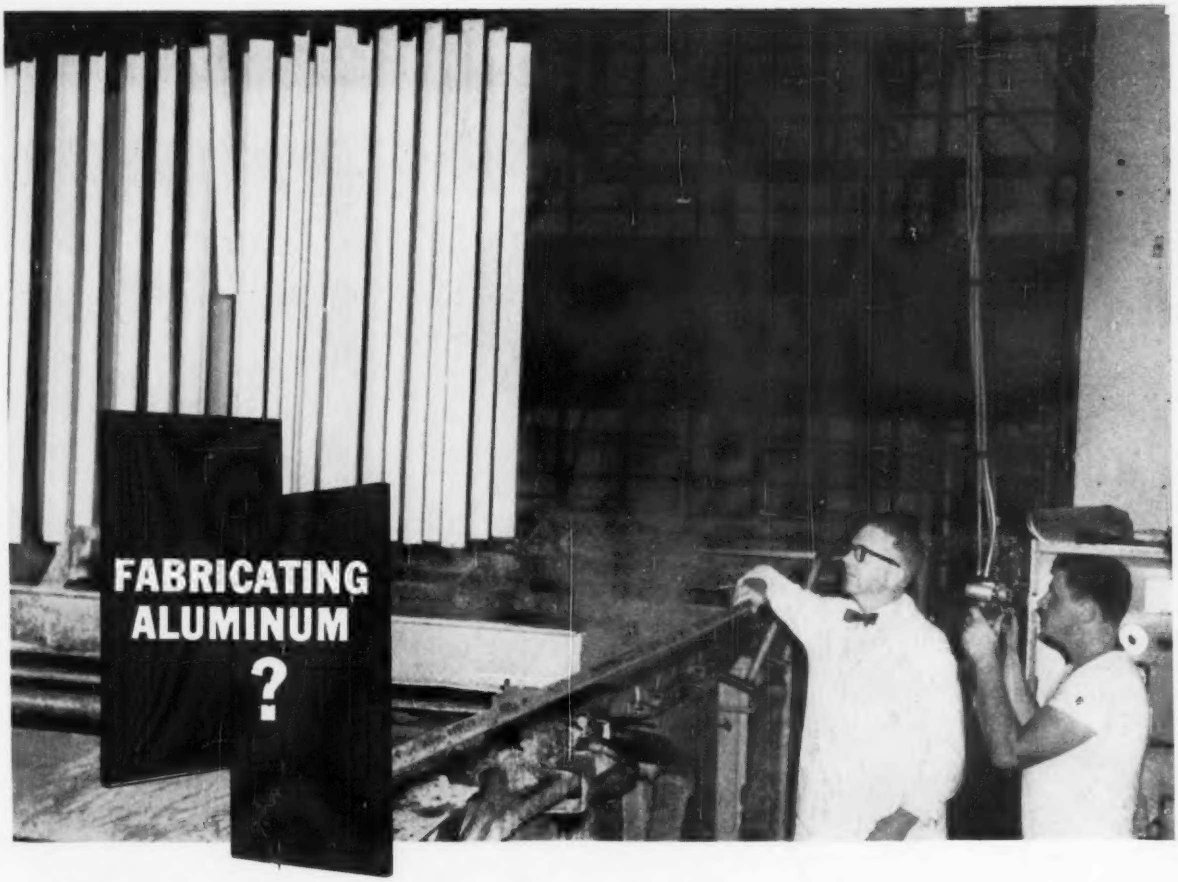
Houston Fearless Corp. — **J. J. Kimble,** appointed corporate controller.

Firth Sterling Inc. — **L. W. French,** appointed buyer, engineering products, Purchasing Dept., Pittsburgh headquarters.

S. K. Towson, Jr., elected general manager, The Elwell-Parker Electric Co., Cleveland.

Joseph T. Ryerson & Son, Inc. —**D. E. Schurman,** named general superintendent, Seattle, Wash. steel and aluminum service plant; **C. C. Warren,** appointed manager, work order, industrial plastics and bearings sales; **M. R. Konupek,** becomes manager, General Order Dept.; and

(Continued on P. 98)



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And Pennsalt's Metal Preparation Service Plan makes sure you keep getting top performance, too. Personalized service from a nationwide organization analyzes your metal preparation needs, recommends the right "work-together" equipment and chemicals, aids installation and startup of automatic machines and follows up with regular service calls. Write for free Booklet 345, "The Pennsalt Metal Preparation Service Plan" . . . and see how we can help your metal finishing dollars stretch further.

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(Continued from P. 96)

C. A. Papadinoff, becomes general superintendent, Boston, Mass., plant.

J. O. Woodbridge, named atomic, missile and chemical products manager, National Forge Co., Irvine, Pa.

E. E. Kirkham, named chief engineer, Machinery Engineering Dept., Pratt & Whitney Co., Inc.

Northwestern Steel & Wire Co. —**W. F. Pelletier,** appointed asst. manager, sales, industrial trade products.

American-Standard, Industrial Div.—**G. W. Brooke,** appointed manager, methods and procedures.

OBITUARIES

R. E. Brooks, 77, co-founder and chairman of the board, Cleaver-Brooks Co., Milwaukee.

Carl Meyers, 68, vice chairman of the board, Colorado Fuel & Iron Corp.

The 180-cycle Multiductor, a low-cost static frequency converter, permits the use of induction on heating and melting applications where costs were previously prohibitive.

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The Multiductor, one of several Power Sources . . . another major product line of AM for the heating or melting of metals by Induction.

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Experience**—the added alloy in **Allegheny Stainless

form

Stainless steels can be bent, drawn, and roll-formed by all the standard techniques known in the metalworking industry. In these operations, stainless requires somewhat greater power and harder tools than it takes to work softer materials. But this characteristic stems directly from stainless steel's superior ability to withstand bending and denting in service.

This attractive stainless cocktail set was produced by flow-turning—one of the newer metalworking techniques that have been developed to offer new answers to many design problems. With these improved fabricating techniques, components that formerly called for two or more materials can often be made better or more economically from one solid material that fills all the requirements of design. The techniques of spinning and abrasive wheel polishing offer special design possibilities, as exemplified by the spun dish on page 7. For further information on the degree of forming possible with a specific type of stainless, contact your nearest A-L office.

joined by all welding and lower temperature joining techniques. Spot and seam welding are readily adaptable to low cost, high volume production and have little effect on the mechanical properties of high strength cold rolled structures.

The various components of the Type 430 heater unit (above, right) are en-

Type 430 clip which is spot welded to the molding. No return flanges are needed.

New joining techniques using adhesives to replace other methods are also receiving wide study in applications where service temperatures do not exceed 500F. The aircraft and missile industries, for example, have reduced joining costs through the use of simpler, more efficient adhesive bonds.

Sample pages from A-L's new free booklet on design

"Design and Allegheny Stainless" is illustrated page after page with hand-picked examples of good design in the gleaming metal.

Twenty-four photographs and drawings in full color, twenty-six in dual color and black and white become a showcase of the versatility of stainless.

The examples are presented with text in terms of Function, Shape, Texture and Color. They cover many fields from automotive parts to holloware for the home . . . to open new horizons for the designer.

There is a working outline of types and properties in the many grades of Allegheny Stainless. Some of the new textures illustrated will interest the designer looking for new effects.

Write for your copy of "Design in Allegheny Stainless Steel"—without cost or obligation. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. A-4-2.*

Packed with actual examples of good design—and ideas for future applications

ALLEGHENY LUDLUM

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EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

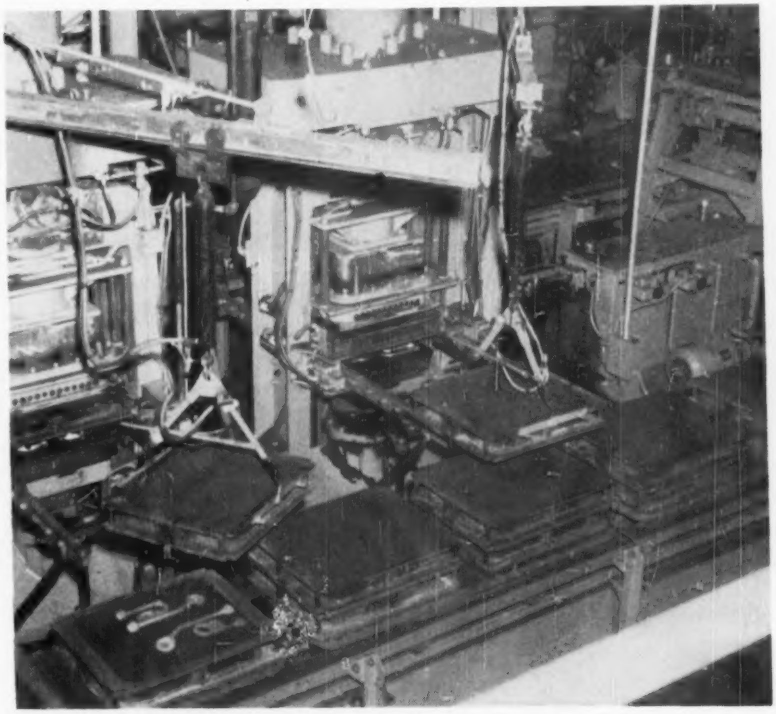
654

New Line Doubles Foundry Yield In Half the Floor Space

By G. Charles and A. J. Kipp—The Tappan Co., Murray, Ky.

Management often becomes wary whenever heavy capital investment seems to be needed for added floor space and increased production—and rightfully so.

Here's a foundry that uses automation at no great expense to attain these goals.



FORMS COPES: Cope mold machines form cope molds. Then copes swing out on bails and manually close with drags. Note copes in unclosed flask.

▪ When the Tappan Company decided to centralize all foundry operations at the company's Murray, Ky. plant, engineers had to focus their attention on this problem: When, and to what extent is automation worthwhile?

Burners and grates were being produced in the Murray plant foundry for gas ranges made at that facility. But with its biggest existing foundry located in Murray, Tappan management decided to centralize foundry functions for all its plants at that point. To make this pay, costs had to be decreased enough to offset freight.

At the same time, an overall expansion was mapped for the Murray facility which would double its current stove production and increase overall floor space to 230,000 sq ft.

Here's the Problem—But even with more overall floor space, it soon became apparent that the space which would be allocated to production would have to be reduced. The extra space was needed for expanded stamping and welding operations.

Current foundry facilities included 17 manually-operated jolt-squeeze machines, linked by a pallet-type conveyor to the pouring and manual shake-out areas. Molds were made from matchplate patterns by an operator at each machine, then shuttled back to the pour area.

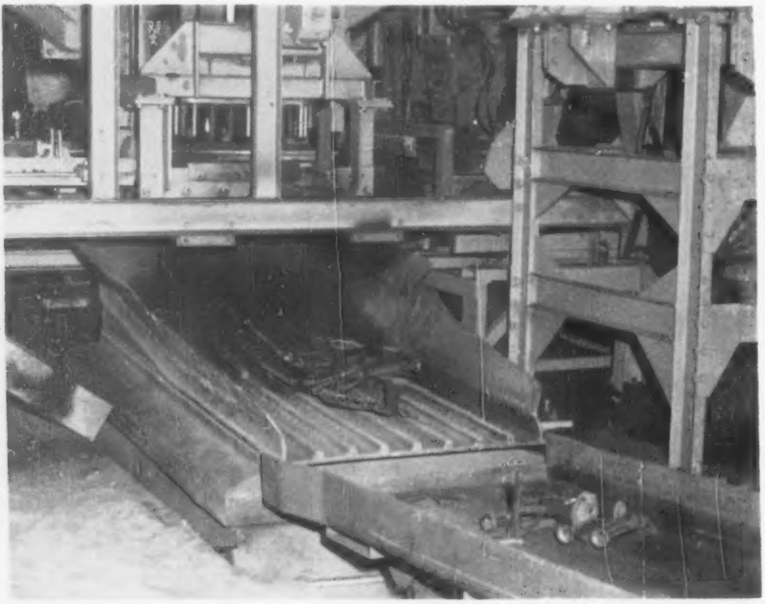
After the molds were poured, cooled, and shaken out, flasks were returned on the same pallet conveyor to the machine operators. The system which covered about

FOUNDRY SHOW—1960
Philadelphia, May 9-13

The 1960 Castings Congress & Exposition will be held at Philadelphia's Convention Hall from May 9-13. Sponsored by the American Foundrymen's Society, the congress will feature over 200 speakers and panelists.

All daytime technical sessions and luncheons will be held at Convention Hall to tie in with the Foundry Exposition. Hours for the latter are 9:00 am to 5:30 pm.

MOVE TO CASTER: Completed molds move by conveyor to pouring area. After casting, poured molds pass into underground cooling area.



PUNCHES OUT CASTINGS: At shakeout area, castings and sand are removed from molds. Clean flasks are returned to the conveyor line.

23,000 sq ft of floor space was enough to meet production needs of the Murray plant alone.

To operate this department, about 35 people were needed per shift. This is exclusive of cleaning and machining operations which were carried out in another part of the plant.

Must Meet Goals—To meet the new needs, a system had to be devised which takes a minimum of capital investment. Yet, it must attain the production goals and efficiency required.

An engineering study of this problem was carried out with the aid of the Osborn Manufacturing Co., Cleveland, builders of automatic foundry machinery.

A new floor plan was developed as shown by the colored area in the drawing. It reduces floor space to 15,000 sq ft, doubles production, and allows placing of cleaning, machining, and shipping operations next to the foundry line.

At the same time, it gave Tappan a semi-automatic line capable of handling present and near term production needs. Yet, it is easily adaptable to full production when required.

How it Works — The new line consists of an L-shaped loop, enclosed by a 400 ft conveyor. As empty flasks move out from the punchout station, operators at stations 2 and 3 pick off empty copes and move them, with a bailer, into an Osborn cope molding machine. Here, the cope is blown and squeezed.

Two more men, on the other side of the cope molding units, remove the completed copes and swing them into position for a subsequent manual close with the drag.

Empty drag flasks move up the loop to the drag molding machines at stations 4 and 5. A single man at each point selects alternate empty drags, and swings them into place for the drag molding cycle.

Blow and Squeeze — The next steps in the cycle, including placing the completed mold on the conveyor, are automatic. Drag flasks, placed by the operator, move into the drag molding machine for blowing and squeezing. Then they move out to a drag roll-over unit, and then to an automatic mold push-on unit which delivers the completed drag mold to the conveyor.

At station 6, cores are set manually in the completed drag molds before closing. Only drag molds move over this section of the conveyor loop.

Closing operations are carried out manually at stations 7 and 8. Copes moving directly from the cope molding machine are ready for the finished drags.

The molds now move around the corner of the conveyor to the pouring area at station 9. To meet the increased production, a new cupola was added. Other design changes in the pouring facilities to accommodate the new line were minor.

Goes Underground—After pouring, the conveyor line dips down (station 10) at a 12° slope underneath the plant floor. The conveyor moves underground for about 120 ft. It allows castings to cool to punch-out temperature.

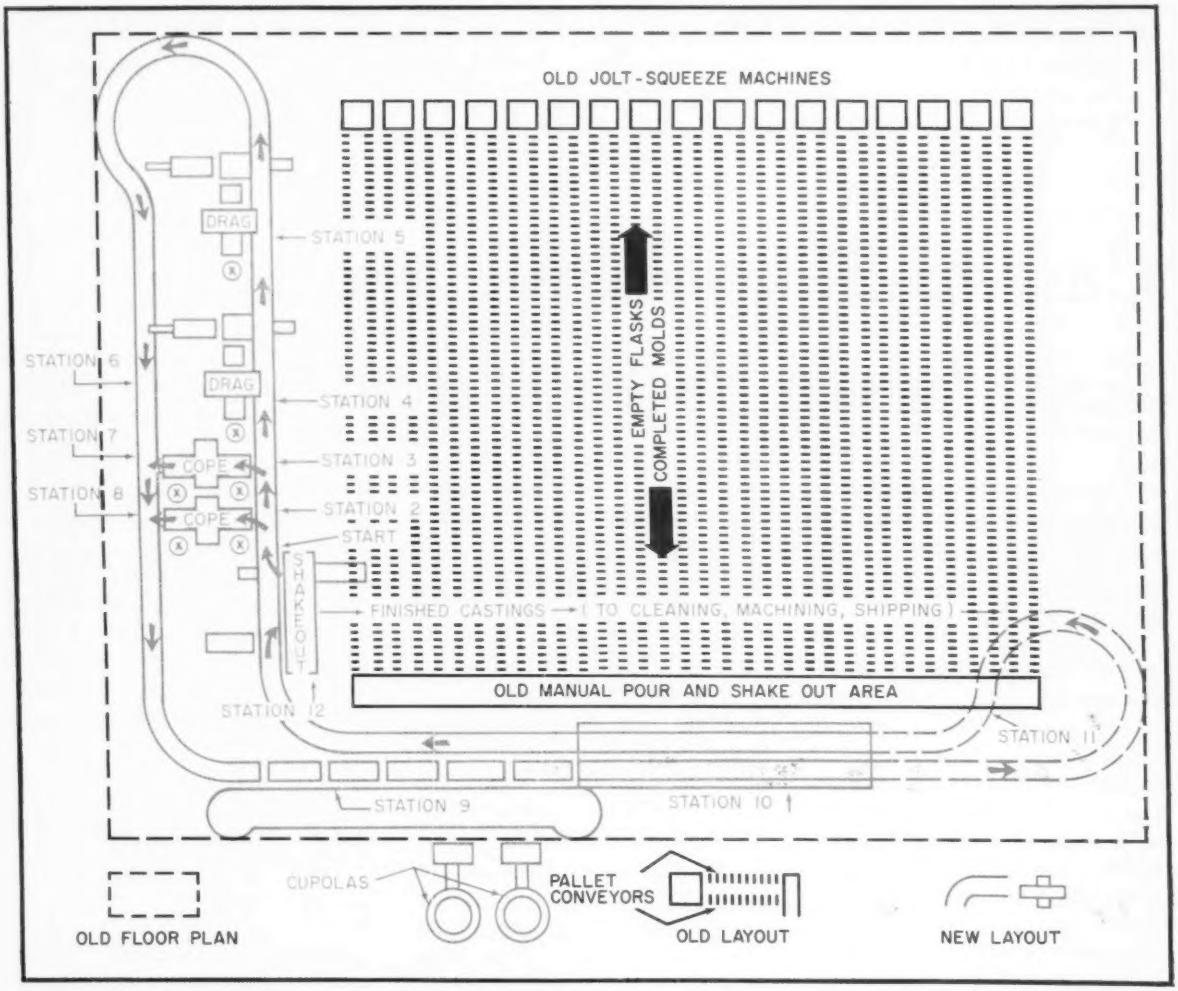
Placing the cooling area underground plays a major part in straightlining of foundry production and space saving. Cleaning and machining operations are located directly above the underground area (station 11).

Mold push-off, casting punch-out, and flask push-on steps (station 12) are handled automatically. Molds are pushed off the conveyor, then castings and sand are punched out. Castings then move to the cleaning and machining area. Flasks are pushed back on the conveyor for the next cycle.

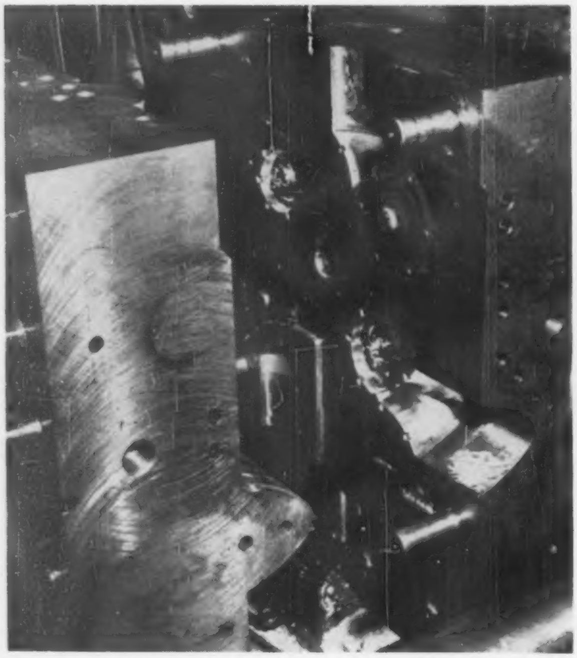
In all, the new line requires about 20 people per shift, plus core-setters. With the new line, foundry production at Murray is about doubled. A completed mold is turned out every 15 seconds.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

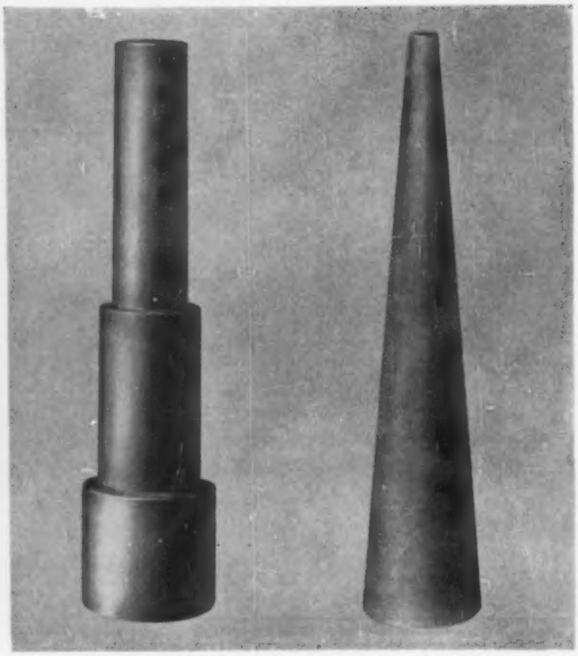
How Automated Foundry Line Saves Space



LESS FLOOR SPACE: New foundry line, in color, takes up about one-half the floor space originally used. Saved space is now used for cleaning and machining of castings, plus other manufacturing operations.



FOR DIECASTERS: Holder blocks, showing hot work inserts, are mounted in casting machine. Alloy is basic SAE 4160 with some added molybdenum.



USES LESS METAL: Stepped out forging (left) for making spinning cone weighs 1200 lb more than cast-to-shape part (right). Material savings: $1830.

Cast-to-Shape Tool Steels Gain Favor With Industry

Why buy metal you don't use? The cast-to-shape method features casting—rather than forging—of tool steels into dies, rolls, or machine parts.

Advantages include lower costs and weight.

▪ Many tools, dies or parts that are now machined from steel forgings can be cast to shape or size economically. While these cast steels were mainly developed to answer automotive needs, they can be applied to the needs of other industries.

What are some of the advantages claimed for cast-to-shape tools? First, there are lower costs; it takes less steps to make a casting than to make a wrought product.

Then there is high compressive strength; the universal grain direction of castings gives a compressive stress resistance up to 400,000 psi in all directions.

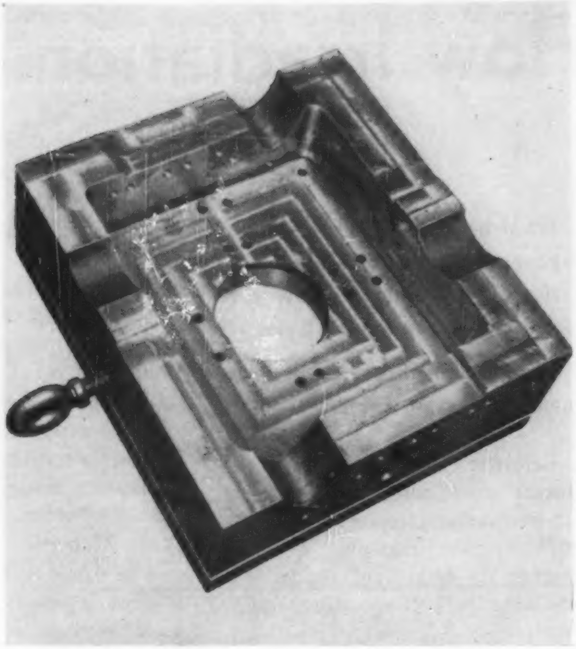
Weight savings is another factor; a casting takes less material. There is also a savings in machining and labor costs; a cast-to-shape tool is closer to finish size, and demands less finish machining.

Diecasters Approve—Producers of aluminum and zinc injection diecastings find the cast-to-shape die retainer block a new and useful development.

Because the diecasting industry covers a wide range of commercial products, the retainers fit into the production of most hard-goods products.

As Mr. F. C. Shields, manager of sales, Forging and Casting Division, Allegheny Ludlum Steel Corp., Detroit, points out, the cast-to-shape technique is very useful when there is a need for blocks weighing over 500 lb. An example is a retainer used for the making of aluminum outboard motor parts. Cast to within ⅜ in. of finish size, savings over fabricated parts in both material and machine time are apparent.

Withstands Abrasion—Castings are also top choices for forming and draw dies because of their good abrasion resistance. In general,



SAVES MACHINING TIME: Machining of 1250 lb block (left) into die retainer to hold automobile horn die takes 150 hours. The cast retainer (right) was within ¼-⅜ in. of finished size. Total savings: $1250.

cast-to-shape dies perform well—whether the job calls for cold or hot rolled steel, sheet or strip, brass, stainless, or aluminum. Size has little bearing on the use. However, it usually follows that the larger the size, the greater the savings.

A large number of the dies used by the automobile industry for the forming of parts such as bumpers, side panels, rear decks, and doors are now cast to shape.

But this doesn't mean that the use of the cast-to-shape technique is restricted to the making of autos. It can be applied to many types of hard goods. Any part that is not formed on a brake can be made by cast-to-shape dies. Examples range from a sewing machine part to a refrigerator door.

Uses Special Alloys — Basic to the process are the special casting metals. Usually melted in electric furnaces, there are two classes of steels: high alloy and low alloy.

The most popular of the high alloy group is a high carbon, high chrome, air-hardening steel. Good compressive strength, low movement in heat treatment, and excellent resistance to abrasion make it a long-wearing die steel.

A refinement of this grade contains 3¼ pct cobalt — added for wear and heat resistance where the die material temperature does not exceed 900°F. It serves in such hot work jobs as gripper dies, hot piercing punches and dies, and all types of hot forming.

For Large Rolls—To impart superior abrasion resistance and grain refinement, 1¼ pct molybdenum is added to the basic grade. This alloy was developed especially for casting of large rolls where greater depth of hardening was required. You can make use of this trait on other die sections where size is a factor.

There are three basic hot work grades—for dies that operate at upwards of 1050°F. One is a good general purpose steel. Another has a very high red hardness and resists sudden temperature changes. A third grade, when heat treated, has good compressive strength, and offers excellent resistance to heat checking and abrasion.

Low alloy cast-to-shape grades are almost equivalent to SAE steel analyses. One is a basic SAE 4160 with extra molybdenum added. It is probably the most widely used, and certainly the most versatile of these alloys.

Applications for this steel covers items such as die blocks, cams, forging dies, trim dies, and flat rolls. The metal can be hardened to 44-46 Rc, or it can be flame-hardened.

There is an alloy, FC#1, used for forming dies. It contains 1½ pct nickel added for toughness. This alloy is used for machine parts subject to heavy stress and short-run hot forming on slow moving equipment.

Points Up Savings — There are many places where castings can save money. The photographs depict a few cases. These instances are not special but they do point up the basic advantages.

Thus, where universal grain direction and high compressive strength are required, castings might be the answer. Although castings are not up to forging in impact resistance and tensile strength, the cast-to-shape method can save metal and machining costs.

How Irradiation Affects Metals

By **W. L. Fleischmann**—Consulting Engineer, Knolls Atomic Power Lab.,* Schenectady, N. Y.

What happens to metals after exposure to products of nuclear fission? For example, how are mechanical properties affected?

A data search brings to light some interesting facts.

- Before selecting alloys, design engineers must consider the effects of environment upon metal behavior. For example, a great amount of data were needed for designing high temperature equipment.

Today, designers must consider the effects of the unique power source, nuclear fission, upon the life and reliability of equipment.

What happens is that fission products, such as fast neutrons, penetrate metals; they upset the orderly arrangement of atoms. Result: altered mechanical properties.

Reviews the Data—How are the properties affected? To what degree? Do all metals respond equally to irradiation? To answer these and other questions, a survey of the data was recently completed. Here are some of the findings.

The first graph depicts the tensile properties of annealed Type 347 stainless steel as a function of neutron dosage. The work was done by Messrs. C. A. Bruch and W. E. McHugh.

You can note from these curves: a large increase in yield strength; some increase in tensile strength; less elongation; and the low rate of work hardening.

Lower Impact Strength—Carbon steels react in the same general way to irradiation. But what about impact strength? The second graph shows the results of tests, performed by Messrs. R. C. Berggren and J. C. Wilson, on Carilloy T-1 steel.

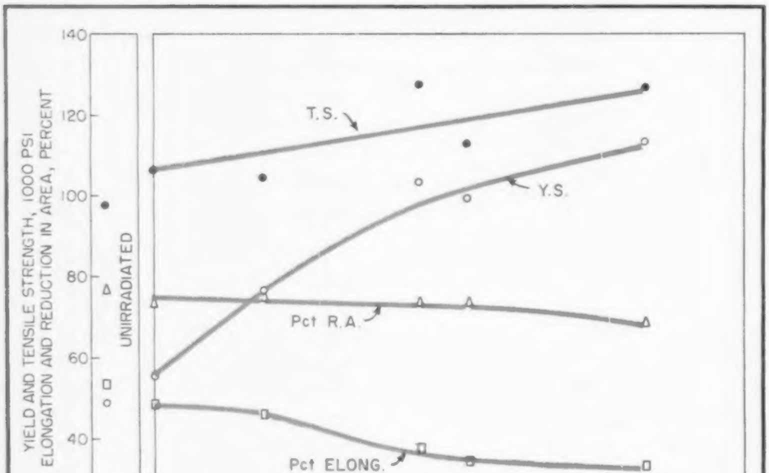
Irradiation shifts the transition temperature and, in the case shown, lowers the shear fracture shelf.

Research has only touched upon radiation-induced changes in steels as they are influenced by grain size, microstructure, and composition differences. However, it appears that a fine-grained steel, aluminum-killed, shows a greater change in transition temperature than a similar silicon-killed steel.

Affects Copper Also — Neutron bombardment also causes a great change in the stress-strain relationships of copper and nickel. A comparison of the third and fourth graphs reveals a large increase in yield strength at all testing temperatures. Dosage is 5 x 10^{19} neutrons per sq cm.

The stress-strain curves have a wider spread at the early stages of deformation. This indicates that irradiation makes the yield strength more temperature sensitive. And it is not an annealing effect.

Neutrons Boost Strengths



Higher Safety Factor—The findings agree; most metals show a consistent increase in strengths after irradiation. Hence, designing stresses based on pre-irradiated data are conservative.

In other words, irradiation effects increase the standard safety factor. There is one word of caution though; higher operating temperatures decrease this effect.

The increase in the brittle transition temperature of steel due to irradiation merely extends a current problem to higher temperature. But good design, and emphasis on sound material — particularly in heavy sections—is an answer.

May Hasten Reaction—From the metallurgist's point of view, there are certain factors to consider. Processes like precipitation harden-

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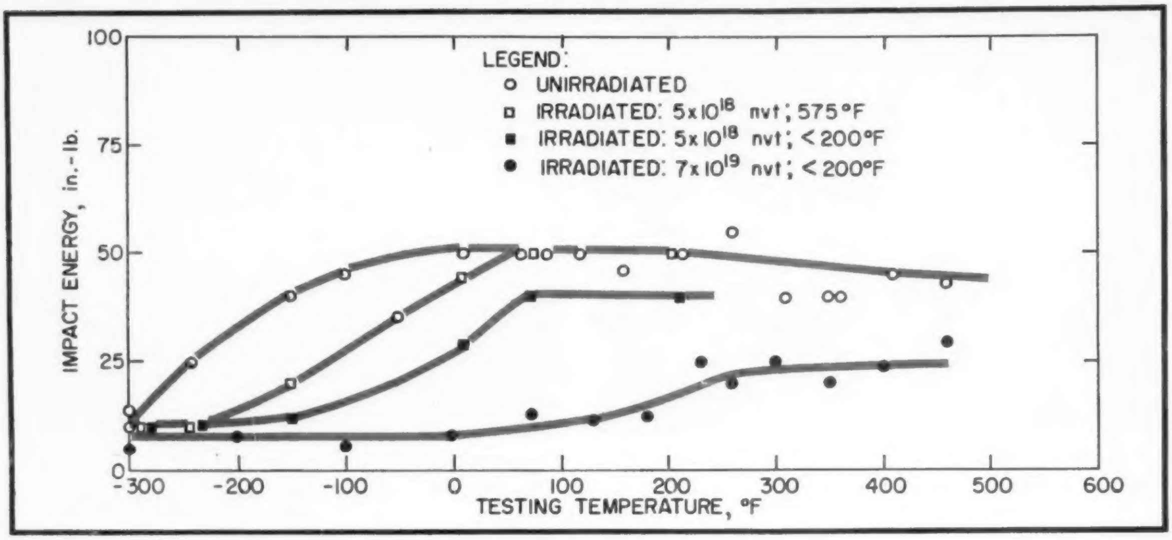
*Operated by the General Electric Co. for the United States A.E.C.

Reduces Impact Strength of T-1 Steel

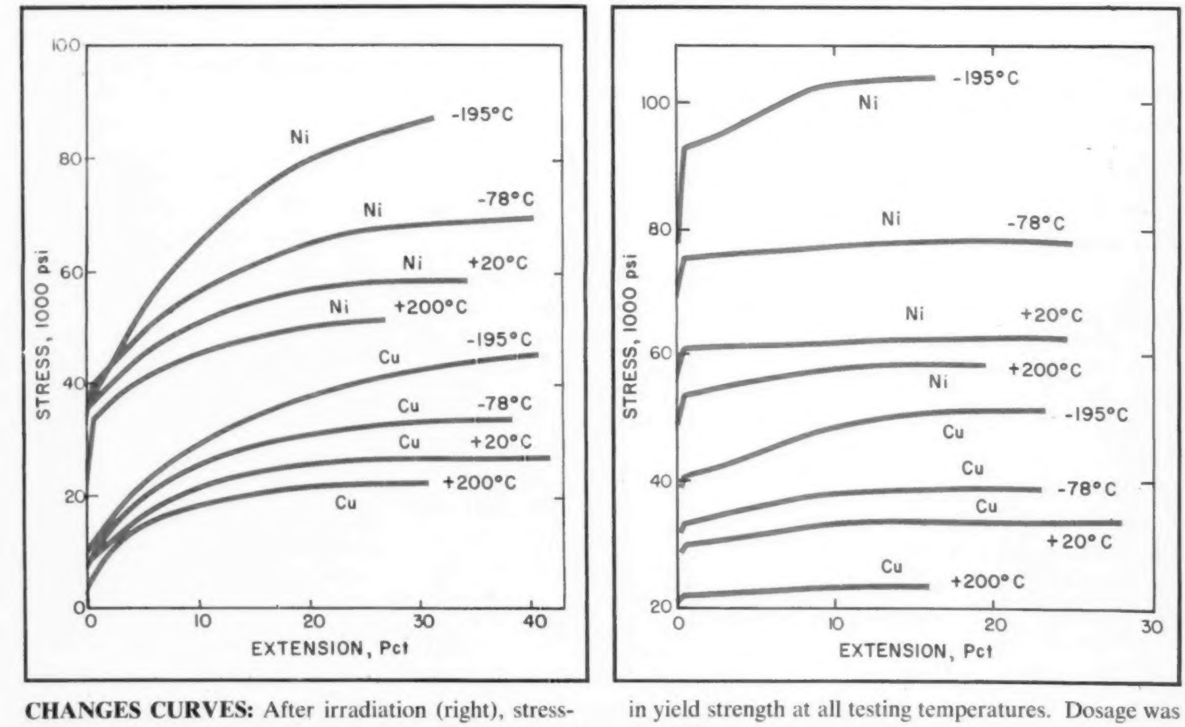


ing, phase transformations, and temper brittleness might occur at lower temperatures. Reason: the energy of the slowing down of neutrons disturbs local regions.

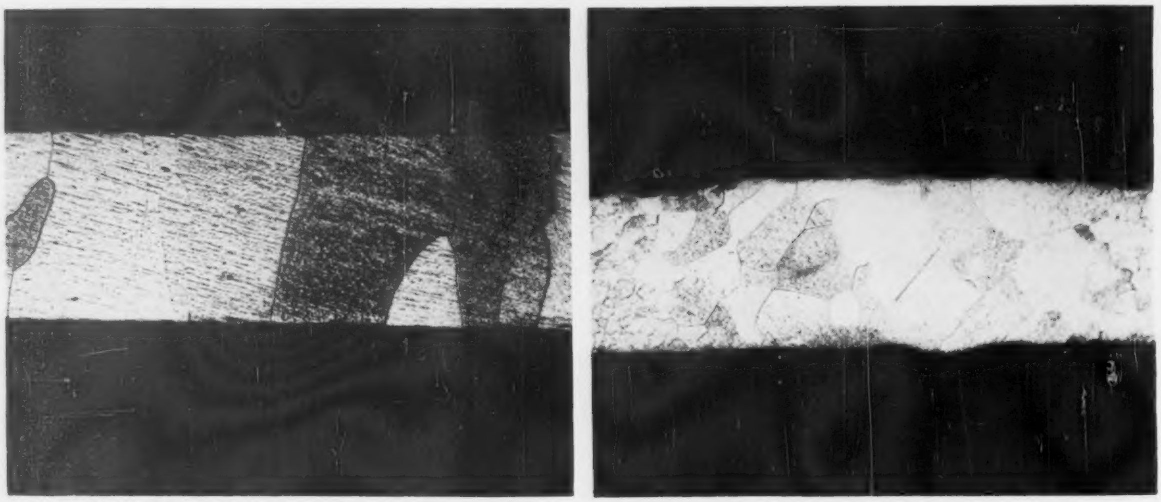
The problem is that the irradiated metal may act like high strength material with a high yield: tensile ratio. Such metals are more sensitive to design details and environment.

These conclusions may be based by and large on engineering judgment. But, the present satisfactory operation of nuclear reactors is proof of a successful engineering approach used in taking irradiation effects of metals into account.

Irradiation Alters Stress-Strain Curves



CHANGES CURVES: After irradiation (right), stress-strain curves of copper and nickel show a large increase in yield strength at all testing temperatures. Dosage was 5 x 10^{19} neutrons per sq cm.



WHICH IS DUCTILE? Inert-gas, shielded-arc weld (left) of molybdenum alloy has coarse grains; joint cannot be bent. Electron beam weld (right) of same alloy can be flexed without cracking.

Electron Unit Solves Problem Of Welding Refractory Metals

By **A. Adelhardt and R. H. Witt**—Mfg. Research & Processes,
Republic Aviation Corp., Farmingdale, N. Y.

Embrittlement is a common problem when welding molybdenum or tungsten.

The answer is an electron beam welder which gives a narrow and ductile weld zone.

▪ Molybdenum and tungsten are top choices for high-temperature service. However, each of these metals often needs to be joined to make complex shapes. And standard fusion welding techniques are not wholly successful.

The basic problem in welding these metals concerns the fusion and heat-affected zones. Heavily worked sheet is fairly ductile at room temperature. But when the metals recrystallize and form coarse grains by exposure to welding's high temperatures, embrittlement often occurs. Blame is placed upon impurities precipitating into the grain boundaries.

What about inert-gas, shielded-arc welding for these metals? Won't the inert gas afford some protection?

Inert Gas Helps—Considerable research has been done on this subject. It shows that you can get some ductility with inert-gas, shielded-arc welding.

Arc-cast molybdenum welds better than the powder metallurgy product because of high density and lower gas content. Alloying with 0.5 pct titanium raises the pure metal's recrystallization temperature by about 300°F.

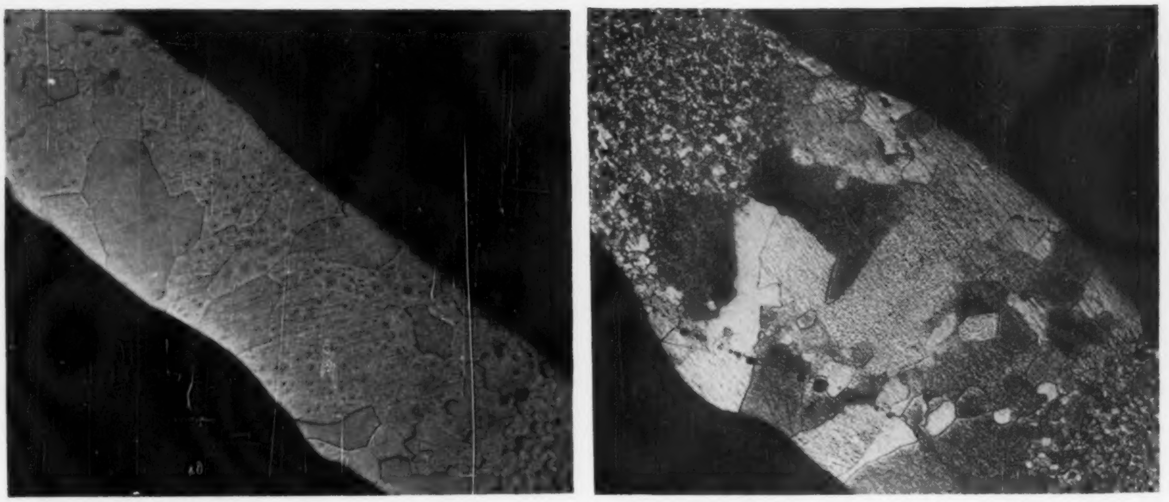
Another point. Either titanium or rhenium appears to be a good alloying agent for overcoming the embrittling effects of oxygen in fusion welds.

Joints Are Brittle—Most tungsten shapes are available only as powder metallurgy products. Only resistance spot welding and tungsten inert gas arc welding have been used for welding tungsten. And even with these methods, it is hard to avoid embrittlement.

Thus, it seems that, to consistently weld these metals successfully, the method used should allow close control of grain size. It should also keep in check impurities which can be picked up in the welding atmosphere.

Electron beam welding appears to be the answer. It is a very promising method for fusion welding of molybdenum and tungsten.

The process provides excellent control of resultant grain size, and the fusion and heat-affected zones of the weld in relation to the extent



SHOWS POROSITY: Grain size and weld zone of molybdenum (left) and tungsten (right) are small. But note the porosity in the powder metallurgy tungsten part as compared to arc-cast molybdenum.

of the zones. Also, the equipment gives a very high vacuum—resulting in ultra low amounts of hydrogen, nitrogen, and oxygen.

Process Proves Out—The welding research laboratory at Republic Aviation Corp. has started studies on the electron beam welding of refractory metals and alloys. Results point up the superiority of this process for notch sensitive metals.

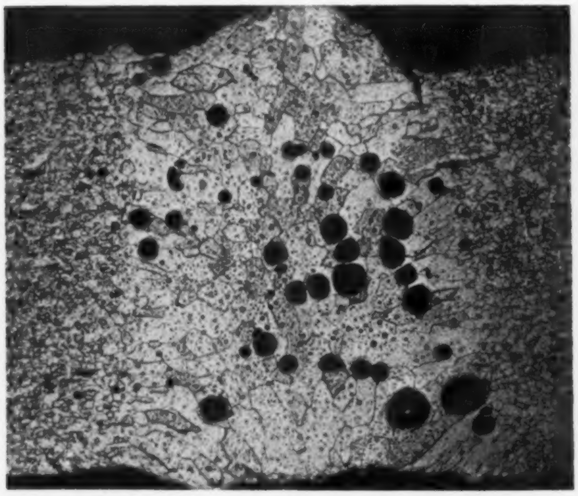
For example, when welding a molybdenum alloy containing 0.5 pct titanium with the inert-gas, shielded-arc process, the weld zones are about six times larger than those produced by electron beam welding. Also, these welds are brittle whereas electron beam welds can be flexed without cracking.

Pure Metals Also—Other refractory metals that have been welded with Republic's electron beam equipment are pure molybdenum (arc cast), pure tungsten (powder metallurgy) and columbium (powder metallurgy).

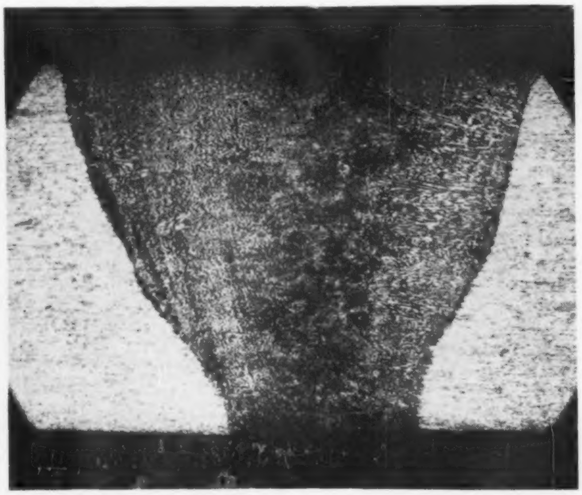
The tungsten has some weld porosity. This is to be expected because of the interstitial impurities common to the powder parts. This effect shows up to an even greater extent with powdered columbium.

Porosity in welded powder-metallurgy material has not been noted for any arc-melted metals. Hence, it points up the need for developing arc-melted tungsten alloys for aircraft parts.

Filler Metal—What about filler metal? Although most welds have been made without filler metal, it is



IMPURITIES ARE CAUSE: As with tungsten, porosity in powder metallurgy columbium shows up after electron beam welding. It is due to impurities.



WELDS PLATE: Electron beam welding unit made this weld in 0.090 in. thick stainless steel. Welds have also been made in titanium up to 5/16 in. thickness.

possible to use filler where joint fit-up is not good. The main problem in this case is to produce high purity filler materials and ductile alloys that can be drawn into wire. In the meantime, base metal strips are used to obtain filler.

In the case of tungsten and molybdenum, present studies on producing ductile welds are concerned with making ductile filler metals and alloys in addition to providing special means of refining grains while welding.

Produces Narrow Welds — The electron beam welder used by Republic Aviation has a modulating feature as well as others that help produce the desirable narrow weld zones.

Made by Sciaky Bros., Inc., Chicago, the welder operates at 30 kilovolts peak. It has a very high potential heat input — about 130 calories.

Welding speeds range from 0-20 ipm for linear welds and 0-6.4 rpm for circumferential welds. You need only change gears to increase linear weld speeds to 60 ipm. This feature provides narrow weld and heat-affected zones coupled with fine grain size.

The large, 30 in. long x 24 in. diam, welding chamber can be evacuated to 5 x 10^{-5} millimeters of mercury within 3 minutes. This speed enhances the overall operation by producing more welds per hour—thus greatly reducing the cost.

Constant Beam Spot—A cathode gun or "point source" gun concentrates the electron beam to give a very high current density. It produces welds of very narrow heat-affected zones as well as an electron beam spot diameter which is constant to a 1 in. depth.

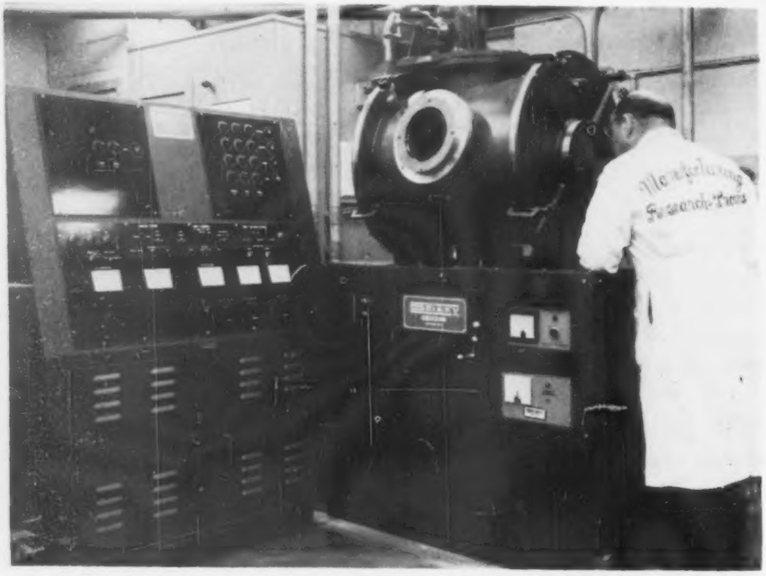
Absence of an electrical field between anode and work permits the use of filler wire, transducers for seam tracking, torch handling, and contour welding without loss of heat control.

The unit also has precise electronic Dekatron controls which include up slope, run, and down slope.

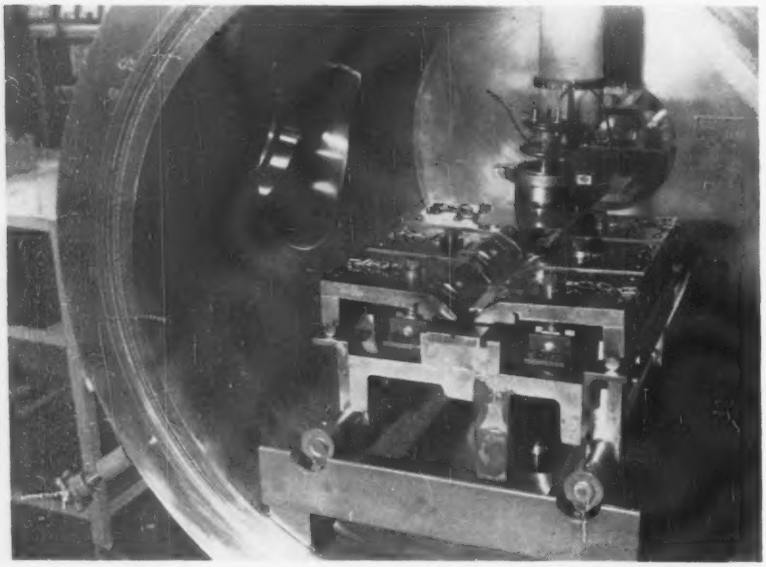
Versatile Unit—Other important features are intermittent on-off control of current during welding operations (this is useful for spot welding, tack welding, and welding high vapor pressure materials); non-vertical gun mounting for complex parts; and defocusing of electron beam for annealing, stress relief, and brazing.

Technically, gages as low as 0.001 in. and over 5/16 in. are weldable with this unit—although the upper limit has not yet been reached.

Without using a focusing coil, welds have been made in a titanium plate, 5/16 in. thick, having better than a 1:1 depth of penetration: width ratio.



EVACUATES QUICKLY: The large, 24 in. diam welding chamber can be evacuated to 5 x 10^{-5} millimeters of mercury within 3 minutes.

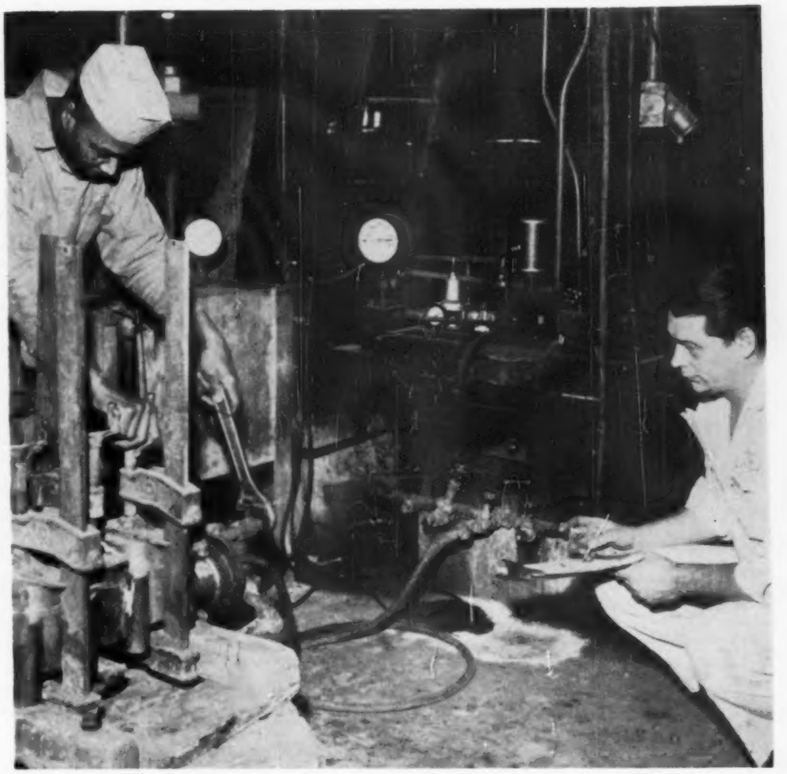


IN ALL DIRECTIONS: Inside view reveals electron gun mounted on central post. It can be moved horizontally, vertically, or on its side.

Tests Detect Unsound Castings

High-pressure hydrostatic tests check the pedigrees of critical nonferrous castings.

An air-activated pump produces pressures to 12,100 psi.



QUICK PRESSURE: A single valve controls hydraulic pressure. Operators check 30 castings per hour. Pressure drops show unsoundness.

▪ High-pressure hydrostatic tests play a vital role in quality control at a Philadelphia foundry. The company produces nonferrous castings and forgings. Many of these products meet extremes of pressure and corrosion. Therefore, they must be checked for soundness at very high hydrostatic pressures.

Few foundries can make such pressure tests above 150 psi on a production basis. Normally 150 psi reveals defects which cause trouble in most non-critical castings.

Require High Pressures — However, over 10 pct of the Philadelphia Bronze and Brass Corp.'s customers specify that their castings must be tested at pressures ranging from 2500 to 5000 psi.

To handle this large volume of tests, the firm operates a full-time, hydrostatic-test department. This department maintains special equipment for rapid, high-pressure inspection.

Test equipment consists of a double-acting, air-driven hydraulic pump; a universal clamping table; and a high-pressure test stand.

The hydraulic pump, made by the Aldrich Pump Co., Allentown, Pa., develops hydraulic pressures from 50 psi up to 12,100 psi. A plant air supply of 90 psi operates the pump. This is the sole source of hydraulic pressure for all tests.

Use Special Stand—An operator clamps large castings to the universal table and connects them to the pump with high-pressure flexible hoses. Small castings fit on the test stand which was designed by the firm's engineering department.

The test stand consists of a metal base with a rubber-cushioned, steel-bottom plate and a steel upper platen. A 50-ton hydraulic jack locks the upper platen.

After a casting is placed on the bottom plate—through which water enters the casting — the operator lowers the upper platen on its guide rods; then he clamps it fast with the jack. This setup allows small castings to be quickly examined at high pressures.

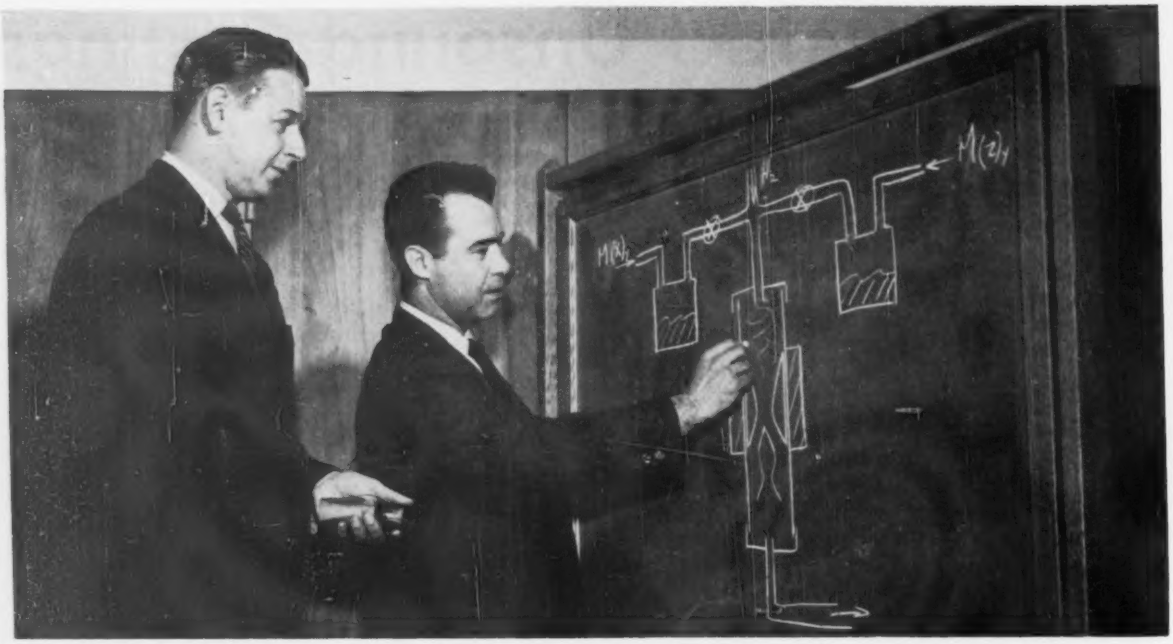
Use of the air-driven hydraulic pump saves plenty of time. Manual pumps, which are used by many foundries, often cause trouble.

Quick and Easy—Up to 30 simple castings can be tested in an hour. Developing the required hydraulic pressure requires only a twist of a valve—instead of laborious pumping by hand. In fact, castings can be tested just as fast as clamping allows.

Visible leakage or failure to hold pressure on a gage detects any unsoundness.

Sometimes the Aldrich pump is used for rupture-testing of tube assemblies. It also produces pressure for a large impregnation tank. This is important because some customers specify that their castings must be impregnated.

Immersion in the tank, which contains metallic particles in liquid suspension heated to 180°F, takes care of such requirements. Pressure is applied to the tank. It builds up to 400-500 psi. This high pressure forces the metallic particles into the casting bodies.



PRACTICAL METHOD: Discussing various aspects of the vapor-phase coating process are Alloyd's Dr. H. W. Schultze, Director of Commercial Sales and Dev., and Dr. R. G. Bourdeau, Project Supervisor.

Vapor-Phase Method Plates High-Melting Refractories

It's intriguing to be able to create alloys of tungsten at temperatures of less than one-tenth its melting point.

That's just one of many developments promised by the versatile vapor-phase process.

- Vapor-phase deposition of many metals onto a broad variety of substrate materials is coming into its own commercially. The list of metals includes several high-melting refractories.

Behind the advance of the vapor-coating process is the work of The Alloyd Corp., Cambridge, Mass. It has resulted in a number of significant innovations:

Lower deposition temperatures allow the coating of lower melting-point base materials. Deposition rates have risen beyond past maximum values. New plating compounds have been used.

Knowledge of process variables has been increased. Effects on the end product have been evaluated.

Varied Uses—In recent months, Alloyd has produced many components coated with pure molybdenum, tungsten, chromium and other metals. Produced for evaluation purposes, these parts cover a wide variety of applications, including missile nozzles, electronic components, and wear and corrosion resistant surfaces for automotive use.

In addition to the metals, certain of their refractory compounds, such as borides, nitrides, carbides and silicides, can be deposited. Samples have all displayed one or more of the following advantages: better oxidation and corrosion resistance, high-temperature endurance, wear resistance, and decorative appearance.

Work is going ahead on developing techniques for other metals, including platinum, columbium, titanium and tantalum. In the research stage are still other metal coatings.

High Purity—The Alloyd process is based on the controlled decomposition of organometallic compounds or the reduction of metal halides. These techniques produce a high-purity adherent deposit which is nonporous. Thicknesses of coatings range from a "flash" to more than ¼ in.

Unlike the plasma torch method,

which can deposit coatings only on exposed surfaces, vapor deposition can be used to coat both the inside and/or outside of tubes and other complex designs. There's no need for direct line-of-sight between metal coating source and surface to be coated.

Parts being coated are effectively "bathed" in the gaseous medium. As a result of the high throwing power and excellent adhesion obtained, the process adapts not only to components with large surfaces, but also to fibrous materials and small particles of either metals or non-metals.

Try Many Bases — Typical base materials successfully coated include nickel, copper, alloy steels, iron, cobalt, rhodium, Inconel, graphite, porcelain, alumina, fused silica, silicon carbide, glass, glass fibers, and sintered carbides.

Adhesion is a key trait of vapor-phase deposition. On a number of base materials, vapor deposited coatings show excellent adhesion, where other techniques won't work.

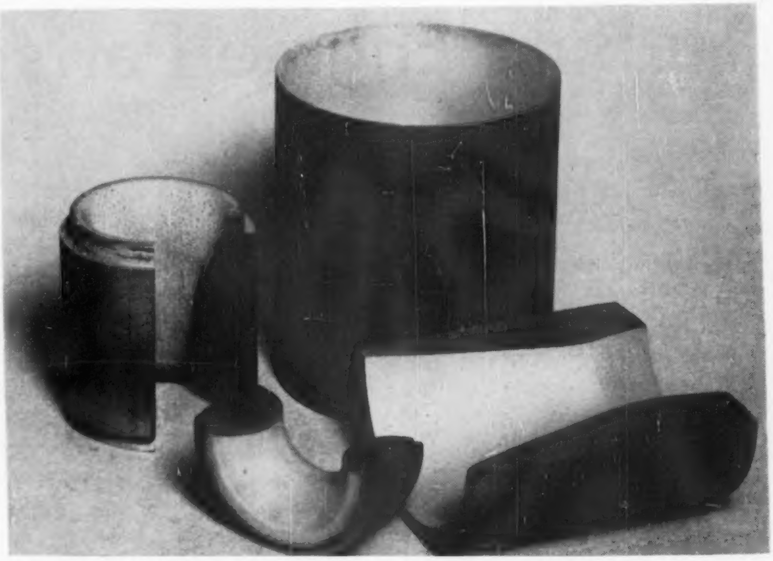
Although several process variables influence adhesion, atom-by-atom deposition gives an intimate bond on a microstructural scale.

Interlock at Interface — The crystalline structure of the coating has close relation to the grain structure of the substrate metal. The interlocking grains at the interface almost match those of the substrate. The coating almost appears to be an extension of the base material.

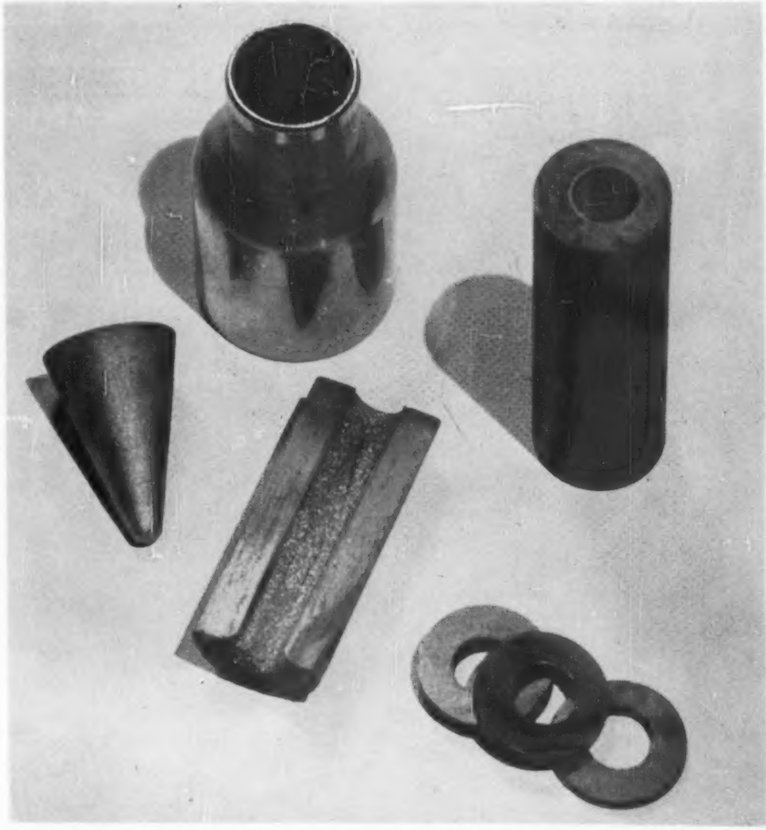
In the outermost surface, the coatings normally reflect the condition of the substrate surface. The coating may be smooth and reflectant if the underlying material is polished before processing. A matte finish undersurface results in a matte-finish coating.

An important factor in making vapor coating commercially feasible is the achievement of substantial deposition rates. Improvements in technique now permit rates of 10 mils per hour.

Research on use of new compounds and modified techniques has lowered the previous minimum deposition temperature from 400° to 250°C. This applies particularly to chromium, molybdenum, and tungsten compounds.



CHOICE OF BASE MATERIAL: Vapor-phase method applies high-density coatings of chromium, molybdenum and tungsten to many bases.



A VITAL JOB: Graphite rocket nozzle shapes get high-density tungsten coat with thicknesses ranging from a few thousandths to 0.100 in.

Ultrasonic Pickling Cleans Turbine Engine Parts

It's vital that parts for gas turbine engines be clean and accurate in size.

A helping hand from ultrasonics gets such results in a fast cleaning cycle.

■ An ultrasonic pickling unit now cleans gas turbine engine parts in 30 seconds. Cleaning of these same parts used to require 1½ hours of soaking.

Complex shapes — castings and weldments included — are handled easily in the newly-designed setup. Surface contaminants are removed by ultrasonically-energized hot acid.

The unit is designed by the user, Lycoming Division of Avco Corp., Stratford, Conn., and is best described as a "double boiler" pickling setup. Equipment built by Branson Ultrasonic Corp., Stamford, Conn., provides the cavitation in the pickling acid.

Time Saver—The present system at Lycoming replaces an involved six-step procedure. Ultrasonic pickling requires only three steps. The first is an ultrasonic bath. This prevents fouling of the vapor blast medium. After vapor blasting, the parts go back into the acid tank for final ultrasonic cleaning.

Where the previous method took 15 minutes per load, the new setup processes parts in less than three minutes per load. The former 1½-hr acid soaking period has now been reduced to a quick 30-second ultrasonic dip.

Aside from the speed factor, the new method saves in other ways, too. The cleaning solution lasts about three times longer. Also, there's a good saving in acid. The cleaning tank holds 50 gal. When spent, the acid is removed and replaced. How often? About once a month.

Many Jobs — Pickling before welding is not the only use for ultrasonic equipment at Lycoming. For instance, a quick dip in the ultrasonic tank removes wax and plating stains after stop-off wax has been removed from chrome-plated parts.

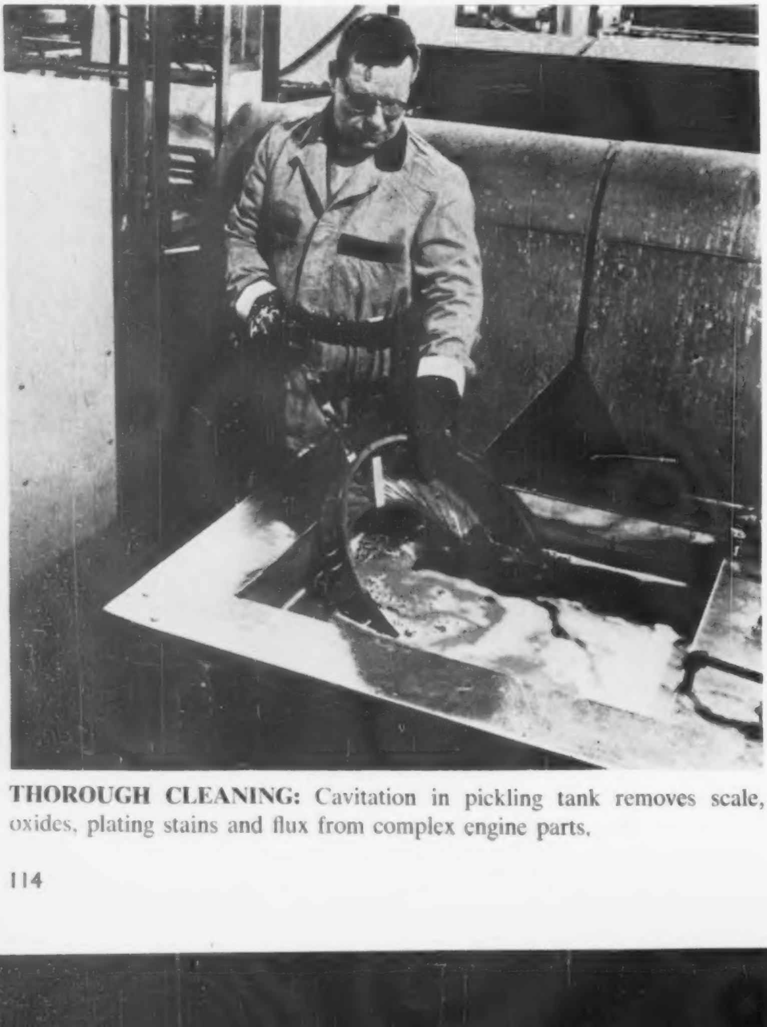
Hard-to-clean oxide coatings come off in 30 seconds. And the bluish cast that sometimes appears after stress relieving disappears in an instant when so treated.

Heart of the system is a 2-kw Sonogen generator that delivers high-frequency energy to a series of eight transducers. Each transducer is mounted against the inside wall of the outer tank.

Crossing Over — Vibrations are coupled into the inner tank of the double boiler by means of degassed water containing a wetting agent. In this manner the pickling acid in the inner tank can be agitated without direct contact between acid and transducers.

The pickling tank measures 30 x 30 x 24 in. deep. It fits inside a water-filled cooling tank that is 6 in. larger on all sides.

Cold water runs through coils in the outer tank. This keeps the transducers cool and keeps them from depolarizing. Smooth function of the transducers is maintained by two interlocks.



THOROUGH CLEANING: Cavitation in pickling tank removes scale, oxides, plating stains and flux from complex engine parts.

Safety—As soon as the water temperature reaches 160°F, a thermal cut-out shuts off the plate power. And a float switch does the same if cooling water level becomes too low.

Steam coils lining the acid tank heat the cleaning solution to about 160°F. When desired, much higher temperatures may be used because much of this heat is dissipated by the outer tank's heat exchange system.

Heavy Workload — More than half the parts used in each Lycoming gas turbine engine are cleaned ultrasonically at least once. Some of them are cleaned up to half a dozen times. To handle this heavy load, the Branson pickling unit keeps busy around the clock.

The pickling agent is hot 30 pct phosphoric acid. Why not use a stronger acid? Because these parts often consist of several kinds of metals. So the cleaning solution used must be strong enough to work on most metals, yet not too strong to damage others.

Along these same lines, Lycoming plans to solve one problem by adding another unit. The acid does not do a thorough job on certain types of stainless steel. The acid works very slowly on such alloys. But the new unit will be designed to handle these metals exclusively.

Future Design — What method did the company use before? First, each part was dry blasted with both silicon carbide and aluminum oxide. Then came cleaning in an electrolytic tank, followed by an acid dip. Fourth step was a cold water rinse. Each part ended up with a hot water rinse and, finally, an air blast for drying.

But the parts met with loss in weight and size. And some of the weldments (the ones with deep recesses) couldn't be cleaned thoroughly by the electrolytic method.

End result? Ultrasonic cleaning cleans all exposed surfaces of the most complex weldment. And there is no loss of metal.

HIDDEN AREAS: Many gas turbine engine parts are so complex that their recesses can't be reached by any other method of cleaning.

DOUBLE BOILER: Steam coils heat the pickling acid in the open tank. Water-cooled outer tank keeps transducers from overheating.

Nickel Alloy Boosts Valve Life

Valves often suffer from "heart damage" — when the valve seat and disc are exposed to harsh conditions.

This company found the cure to be a special high-nickel containing alloy.

▪ Material choice plays a major role in valve design. In the case of industrial globe-valve seats and discs, it is the key to high performance.

A few years ago, globe-valve failure was common — especially when exposed to severe throttling and high temperatures. The most common failure was erosion and wiredrawing of the seats.

To meet the challenge, engineers and metallurgists at Lunkenheimer Co., Cincinnati, O., started looking for new materials of construction. The search soon led to nickel and its alloys. It resulted in the development of Brinalloy—a new seat and disc material with a high nickel content.

New Valve Design — The flat, narrow, micro-optically finished seats are brazed into the valve body. With perfectly flat discs mated to the seats, they represent a new valve design.

One such valve, the Lunkenheimer LQ600 proves that it is tops in endurance and performance, regardless of the severity of job. Experience gained from actual tests on many "killer" jobs shows that LQ-600 valves withstood throttling, high-velocity turbulence, high temperatures and pressures for more than 5 years in steady operation.

These tests on LQ600 valves were conducted at nearly 100 industrial plants.

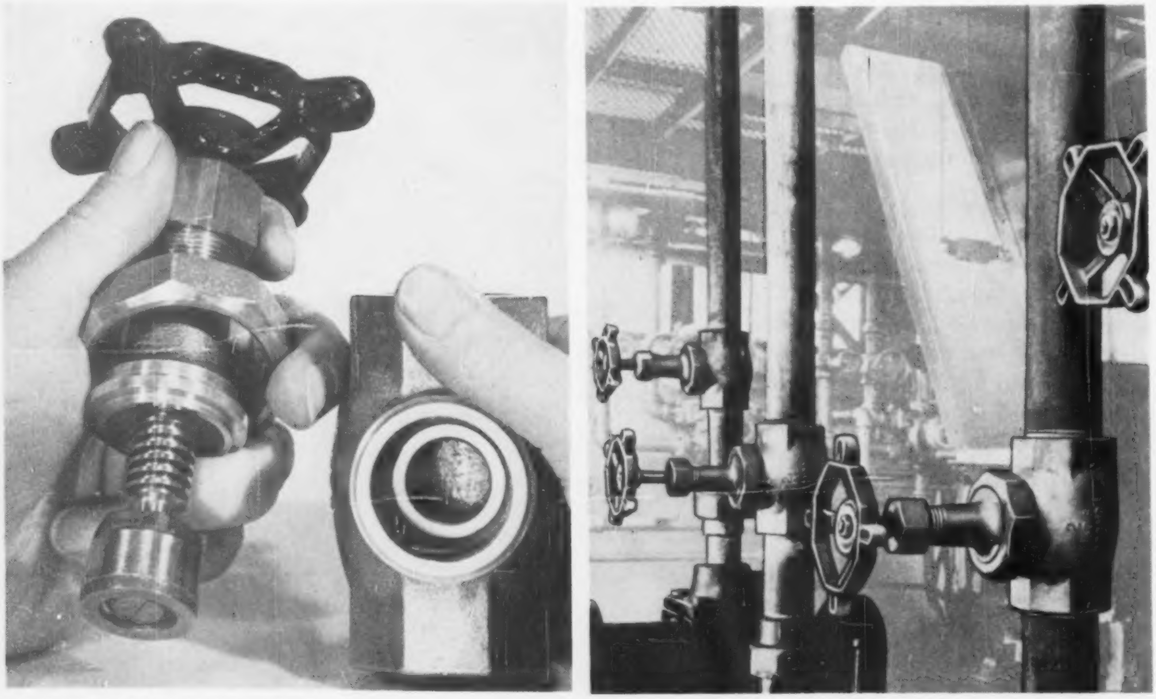
Use Special Alloys — The body and bonnet of the valve are made of an original alloy claimed to be the highest-grade valve bronze. The stem is made of a silicon-bronze alloy, Stemalloy, especially designed for such jobs.

And, of course, the heart of the valve, the seat and disc, is the patented alloy of nickel, chromium, and silicon.

Defrays Repair Costs — It takes only one or two repair jobs to spiral the maintenance costs up to a point many times higher than the original price of the valve.

Nickel alloys in the heart of the valve do away with this needless expense. The makers of Brinalloy claim that the new alloy makes the LQ600 a maintenance-free valve. It requires no renewing, regrinding, or replacing of seats and discs during the entire life of the valve.

Thanks to design and material choice, the LQ600 fulfills an industry need—a tight valve for severe throttling jobs. And nickel alloy plays a leading role.



RESIST CORROSION: Brinalloy seats and discs of LQ600 valves cut down on erosion and leakage. Despite severe operating conditions, these valves are reported to remain maintenance free year after year.

Steel fabricators...

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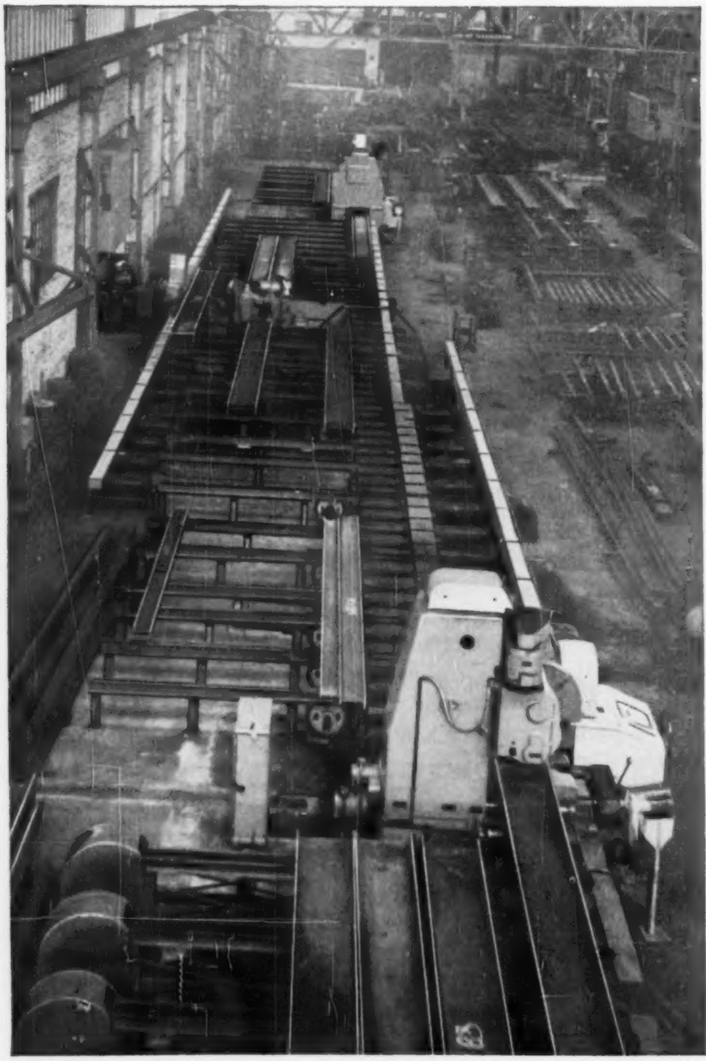

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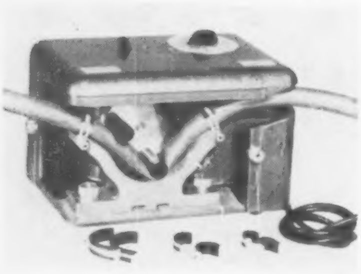
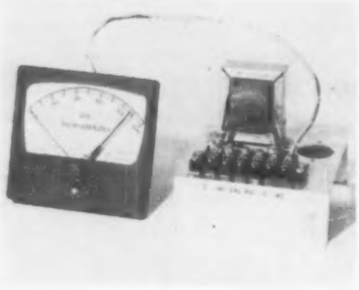
New Materials and Components



Induction Pump Has All Self-Lubricating Parts

Accommodating hoses of any size up to 1 in., a flow induction pump utilizes a flexible hose on a multi-curved track. The hose moves liquids, slurries, emulsions, gases, and dried powder. None of the materials ever touch any metal parts. They pass only through the hose portion. The flow inducer is variable from a few cc per minute to nearly 500 gph. Some of its features are: steplessly variable motor up to 200 rpm; reversible switch permits flow in either direction. (Schueler & Co.)

For more data circle No. 24 on postcard, p. 127



Control Kit Offers Simple Assembly

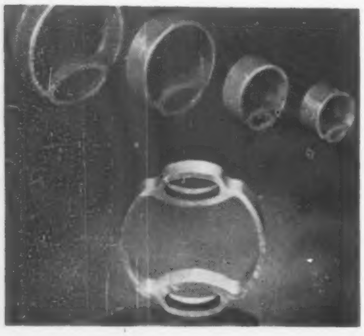
Adapting to almost every electrically-measurable variable, a control kit features flexible installation in relatively uncomplicated control applications. The control suits applications where only a direct unamplified signal is available. The heart of the kit is a continuous-reading meter relay that permits instantaneous reset without the use of either interrupters or electronic circuitry. Control action of the meter relay is directly linked to the signal. An adjustable pointer sets the signal limit. The moving pointer shows the signal at all times. (Assembly Products, Inc.)

For more data circle No. 25 on postcard, p. 127

Counter Has Variable Read-Out Display Time

An all-purpose electronic counter provides 0.1 v sensitivity and superior trigger level circuitry. The counter directly measures frequencies from 10 cycles per second to 1.2 megacycles; time intervals from 1 microsecond to 10^6 seconds; and periods from 0.00001 cycles per second to 100 kilocycles. The counter has an in-line read out with results displayed in large numerals and with an automatic decimal point. Display time is variable from 0.1 to 10 seconds, or "infinite." The unit has an accuracy of ± 1 count ± crystal stability. (Hewlett-Packard Co.)

For more data circle No. 26 on postcard, p. 127



One Pipe Can Carry Several Products

Designed to eliminate extra piping, a new tubular product features built-in channels to simplify and reduce the cost of recirculating heating fluids in piping systems. The one-piece extruded section contains two integral channels flanking a large, product-carrying pipe area. The heating medium travels through one small oval passageway, maintaining temperature of bulk material in the product line to insure a free flow. At a terminal, the fluid is reheated, if necessary, prior to being returned through the second channel. The piping can also be used for the circulation of refrigerants. (Aluminum Co. of America.)

For more data circle No. 27 on postcard, p. 127

Stepping Motor

Available with 8, 10, 12, 18, 20 and 24 steps per revolution—and in uni-directional or bi-directional models with or without detent—a stepping motor's design presents many unusual features. Mechanical load can be positioned manually in either direction. Direct coupling of the shaft to the load permits mounting of a position indicator on the shaft. Shaft extensions are available at one or both ends. Stepping rate is 15 to 25 steps per second. Models are available in any duty cycle within operating voltage range from 6- to 350-v dc. (Ledex, Inc.)

For more data circle No. 28 on postcard, p. 127

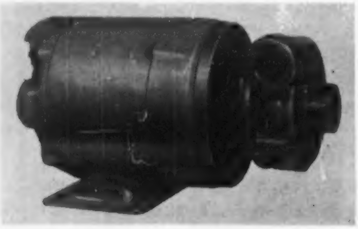
Epoxy Laminates

Continuously-manufactured, thin-epoxy - fiberglass reinforced laminates, with mylar faces, are available in widths up to 48 in. Thicknesses range from 0.006 to 0.060 in. The material has good physical and electrical characteristics. In addition, the laminates are flame retardant. (Swedlow Inc.)

For more data circle No. 29 on postcard, p. 127

Centrifugal Pumps

Ideally suited for chemical circulating and transfer work in pilot plants and laboratories, or on equipment that requires the circulation



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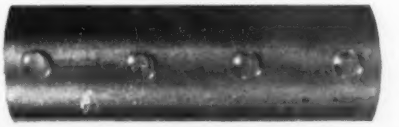

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of small quantities of clear corrosive liquids, a ¾-in. centrifugal pump is available in Hastalloy "C" (ISO-321) or in 316 stainless steel. The three principle parts of the pump—casing, impeller and adapter—can be furnished in either material. All other parts are AISI 304 stainless steel. Capacities range up to 16 gpm with heads up to 28 ft. Standard drip-proof or explosion-proof motors are available. (Goulds Pumps, Inc.)

For more data circle No. 30 on postcard, p. 127

Hydraulic Packing

Several desirable performance characteristics are available in an economical hydraulic packing material which consists of a synthetic compound. A plastic and an elastomer have been compounded to produce the new packing material, which is highly resistant to abrasion; it can be used in both acid and alkaline applications. Laboratory tests show that the tensile strength of the new compound is over 3000 psi. The material seals effectively in air, oil, water and water-based, fire-resistant hydraulic media. (E. F. Houghton & Co.)

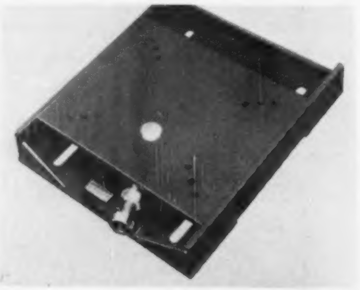
For more data circle No. 31 on postcard, p. 127

Cam-Operated Valves

A two-way, cam-operated valve operates at pressures up to 1500 psi. The force required to activate the plunger is 45 lb. This normally-closed valve has no leakage in the closed position. Rated flow is 30 gpm. Total weight is only 4½ lb. (Barworth, Inc.)

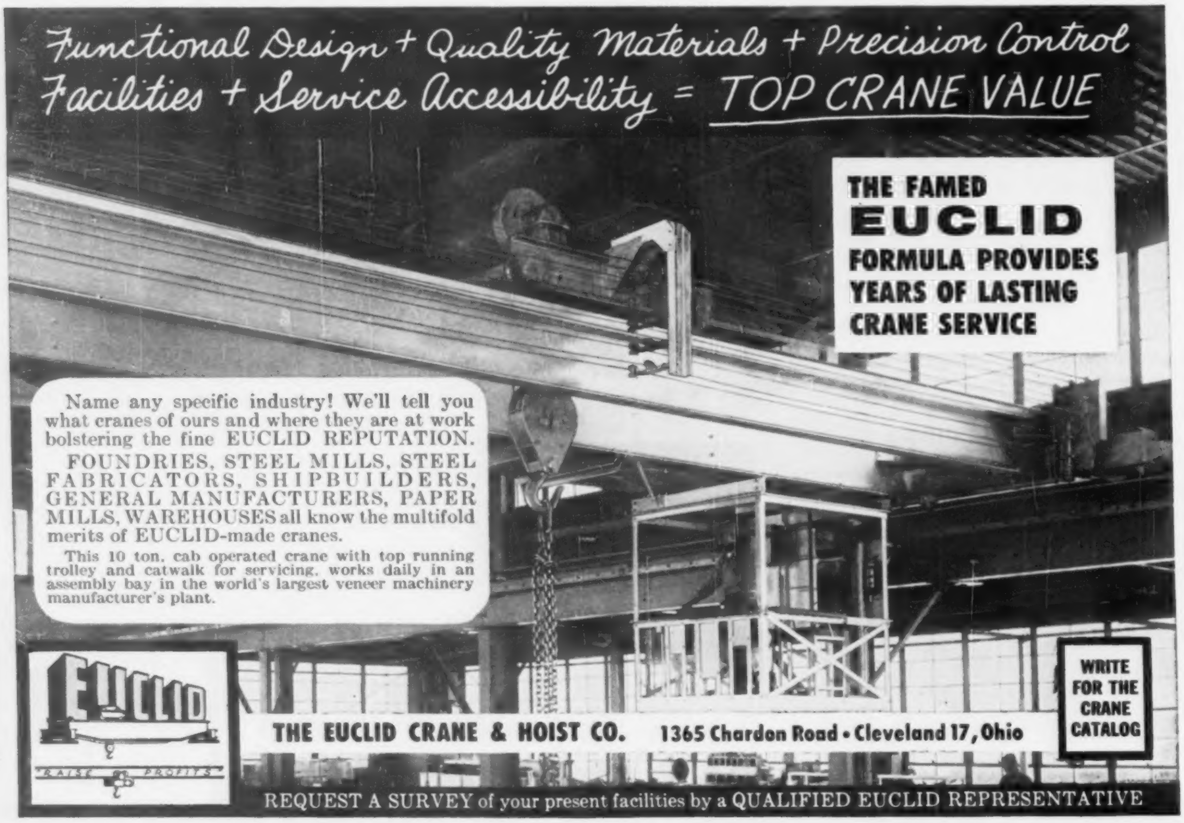
For more data circle No. 32 on postcard, p. 127

Pancake Motor Base



For use in variable-speed sheave installations where space is at a premium, sliding motor bases of a low pancake design can be moved quickly and easily to shorten center-to-center distances; and to free V-belts from the grooves for sheave adjustments. These bases are extraordinarily low. The top plate of each motor base is drilled to suit various combinations of NEMA motor frames. (T. B. Wood's Sons Co.)

For more data circle No. 33 on postcard, p. 127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THE FAMED EUCLID FORMULA PROVIDES YEARS OF LASTING CRANE SERVICE

Name any specific industry! We'll tell you what cranes of ours and where they are at work bolstering the fine EUCLID REPUTATION.

FOUNDRIES, STEEL MILLS, STEEL FABRICATORS, SHIPBUILDERS, GENERAL MANUFACTURERS, PAPER MILLS, WAREHOUSES all know the multifold merits of EUCLID-made cranes.

This 10 ton, cab operated crane with top running trolley and catwalk for servicing, works daily in an assembly bay in the world's largest veneer machinery manufacturer's plant.

EUCLID
RAISE PROFITS

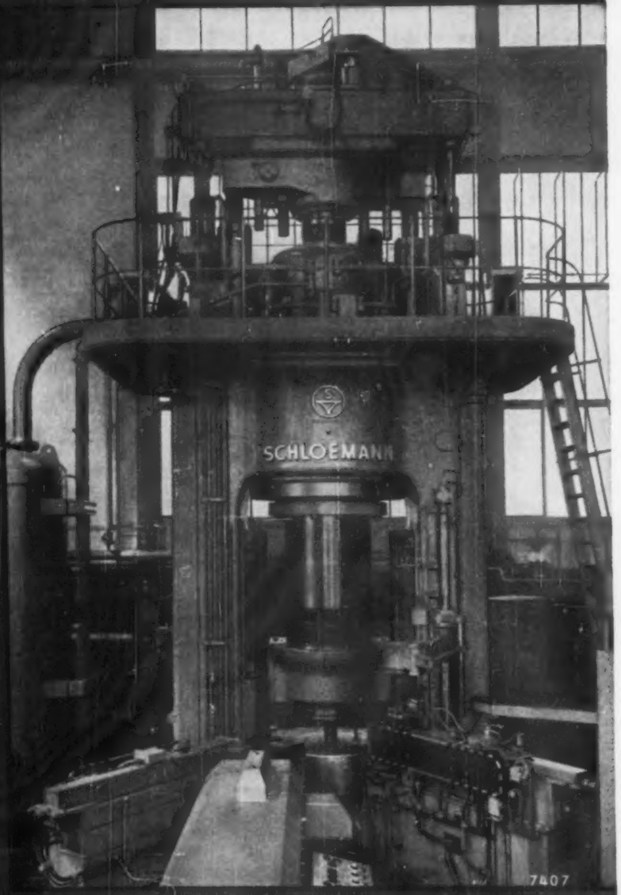
THE EUCLID CRANE & HOIST CO. 1365 Chardon Road • Cleveland 17, Ohio

WRITE FOR THE CRANE CATALOG

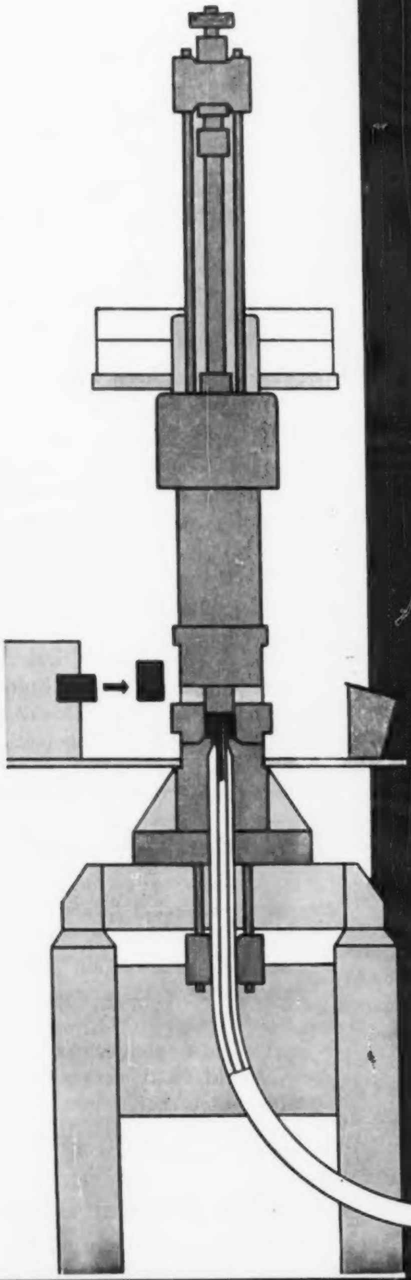
REQUEST A SURVEY of your present facilities by a QUALIFIED EUCLID REPRESENTATIVE

SCHLOEMANN

Extrusion Presses Automated



The fully automatic operating cycle of this vertical 1,375-ton tube and rod extrusion press also includes: billet charging; loading and removing the dummy, as well as the scavenging block; severing the butt, cutting and ejecting the extruded product; cooling mandrel, container, and die · Essential features of the press are covered by patents · Only one operator required · 21 vertical SCHLOEMANN extrusion presses equipped for manual or electro-hydraulic automatic control have been built within the past nine years · Latest SCHLOEMANN horizontal extrusion presses also feature fully automatic operating cycle.



FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

Take a Money-Saving Look... AT THE WAY

TMI QUALITY TUBING *REDUCES* COSTS ON QUALITY ASSEMBLY LINES

It is surprising how often top management's recommendations to buy BETTER quality in metalworking components turn into success stories for TMI tubing from .050" to 1.25" O.D. drawn to tolerances as close as .0005" when needed. For big business . . . and for little business . . . our services are always the same. It's more than a slogan . . . it's a fact:

Only the Best Quality Cold Drawn Stainless Steel and Special Alloy Tubing Is Worthy of the Name

TMI!

Serving a selected list of pioneering customers in aviation, nuclear energy, instrumentation and quality manufacturers in the metalworking industry. If your work is classified it stays that way *all ways* at TMI.

TUBE METHODS INC., Bridgeport, Montgomery County, Pennsylvania. Engineers, Metallurgists and Manufacturers Since 1941.

The Mark of Quality TMI

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 127.

Power Transformers

Large detailed illustrations display the principal types of transformers in a company's four-page brochure. Built for practically every type of service up to 69,000 v, the complete line includes: ventilated dry-type transformers; mineral-oil and askarel-immersed power transformers; inert gas-sealed, dry-type units; ventilated dry-type substation transformer core and coil assemblies; pole-type distribution transformers and many others. (Niagara Transformer Corp.)

For free copy circle No. 1 on postcard, p. 127

Wheel Dressers

A eight-page folder describes a line of fluidmotion wheel dressers. These units dress two angles tangent to a radius in one continuous motion with 0.0001-in. accuracy. The folder contains diagrams and specifications. (J & S Tool Co., Inc.)

For free copy circle No. 2 on postcard, p. 127

Graphite

Properties and uses of graphite are discussed in an eight-page, pocket-sized folder. The folder explains the three types of graphite and outlines in detail their main properties, characteristics and uses. Being odorless, tasteless, non-toxic and easily pulverized, graphite has gained great value as metallurgical carbon, as a super refractory and as an industrial lubricant. (The United States Graphite Co.)

For free copy circle No. 3 on postcard, p. 127

Toggle Switches

High-performance toggle switches and toggle-switch assemblies for use in airborne, mobile, marine, electronic and commercial applications are discussed in a 32-page catalog. The catalog covers a wide variety of military versions that have been tested and approved under MIL-S-3950A. Other designs include: hermetically-sealed, electrical-memory, rocker-actuated, pull-to-unlock and miniaturized types. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 4 on postcard, p. 127

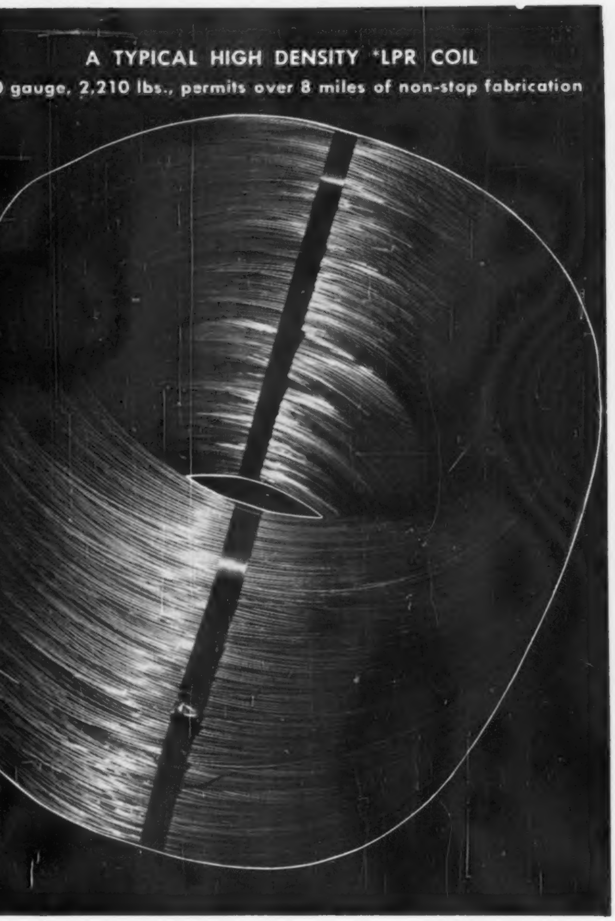
Welder Transformers

A 20-page technical brochure contains precise data on resistance-welder transformers. These data include: construction techniques, tranformer ratings and load demands, magnetizing and load transients, and application and duty cycles. Illustrations of a transformer under construction are very informative. (The Taylor-Winfield Corp.)

For free copy circle No. 5 on postcard, p. 127

Metal-Powder Data

A comprehensive directory of all commercially available powders used in powder metallurgy has just been released. The 22-page directory includes detailed technical data for the powders produced by 29 com-



A TYPICAL HIGH DENSITY *LPR COIL

10 gauge, 2,210 lbs., permits over 8 miles of non-stop fabrication

This LPR Tag

on your Brite Wire coils means greater efficiency in your fabricating operations —at no added cost

Typical *LPR Savings as reported by Users (See Note)

Look Into *LPR's Yourself

Our Portsmouth Division pioneered the development of *LPR coils in the early 1950's. PURPOSE—to improve efficiency and reduce costs in our own Welded Wire Fabric operations.

We'll gladly share our experience with you if you're a Brite Wire fabricator. We also invite you to visit our Portsmouth Mill to see for yourself how *LPR's perform. For an appointment or for further information on any DSC products, please call your nearest DSC Customer "Rep" or write Detroit Steel Corporation Box 4308, Detroit 9, Michigan.

- **Downtime frequency due to coil changes and setup adjustments cut as much as 95%.**
- **Cumulative coil-end scrap trimmed to the bone.**
- **Man-hour costs slashed (20% and more is common).**
- **Material handling time and expense substantially reduced. Unloading time alone cut from 16% to 50%.**
- **High density, self-supporting coils release 15% to 20% of storage space for more productive uses, improve inventory management.**
- **Machine productivity increased . . . for example, 1 man now operates 4 machines against 3, previously.**
- **"Returnable-carrier" problem and small storage racks eliminated.**

NOTE—Savings and improvements cited were experienced following switch from traditional mill weight bundles (150 pounds to 400 pounds).

CUSTOMER "REP" OFFICES

Detroit, Grand Rapids, Jackson, Mich.;
Cleveland, Cincinnati, Columbus, Dayton, Toledo, Ohio;
Hamden (New Haven) Conn.; Worcester, Mass.;
New York City, Rochester, N. Y.; Chicago, Ill.;
Milwaukee, Wisc.; Indianapolis, Ind.; St. Louis, Mo.;
Charlotte, N. C.; Louisville, Ky.; Houston, Texas.

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Performance Proved DSC®

DETROIT STEEL

Flat Rolled and Wire Products

panies. It covers all types of ferrous and nonferrous, granular-metal powders and graphite powders used principally in powder - metallurgy applications. (For free copy write on company letterhead to the Metal Powder Producers Association, 60 East 42nd St., New York 17.)

Heat Detectors

Thermochrom crayons and DectoTemp paints measure surface temperatures quickly. Changes in color indicate temperature changes. Eighteen of the crayons provide temperature measurements from 150° to 1240°F. Thirty-six of the paints cover a measurement range from 104° to 2462°F. Some of these heat detectors undergo 2, 3 or even 4 color changes at different temperature levels. (Air Reduction Co.)

For free copy circle No. 6 on postcard, p. 127

Analysis and Control

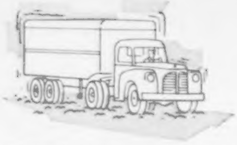
Techniques and instruments for leak detection, mass spectrometry, chromatography, moisture monitoring, and other types of analysis and control are described in a 16-page general catalog. All instruments are standard products. (Consolidated Electrodynamics Corp.)

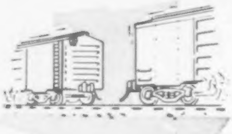
For free copy circle No. 7 on postcard, p. 127

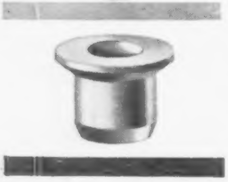
Bronze Bearings

An eight-page brochure describes a company's complete line of sleeve bearings. These include cast bronze, babbitt on bronze, graphited bronze, babbitt on steel, bronze on steel, rolled-strip bronze, aluminum alloy on steel, solid-aluminum alloy and powdered bronze and powdered iron. Over 900 sizes of cast-bronze bushings, more than 350 electric-motor bearings, and over 500 sizes of bronze and aluminum-bronze bars are available from stock. A picture-story layout explains how these bronze products are made. (Johnson Bronze Co.)

For free copy circle No. 8 on postcard, p. 127







With the new Townsend Versa-Lockbolt* you get the same high tensile values as with the standard type but they cost less and are easier to install.

Wider grip ranges in a given size are provided by additional locking grooves. Other design changes make it feasible to use them in relatively oversized holes. Inspection time is reduced since hole size is less critical.

These features make for flexibility of design—make calculations simpler and more accurate.

Versa-Lockbolt installation is fast and guns provide uniform draw down or clinch—locking the collar with up to five tons of pressure. The new collar with its flanged integral washer makes it especially suitable for fastening even light gage materials.

For more information on how to get new vibration-proof fastening economy, write Townsend Company, Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pa.

*Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307 2,531,048; 2,531,049 and 2,754,703

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

Cherry Rivet Division · Santa Ana, California one late decision on inventory and this $50 part* could cost you $5,000

IBM RAMAC® 305

controls inventory data to prevent costly "out-of-stock" conditions

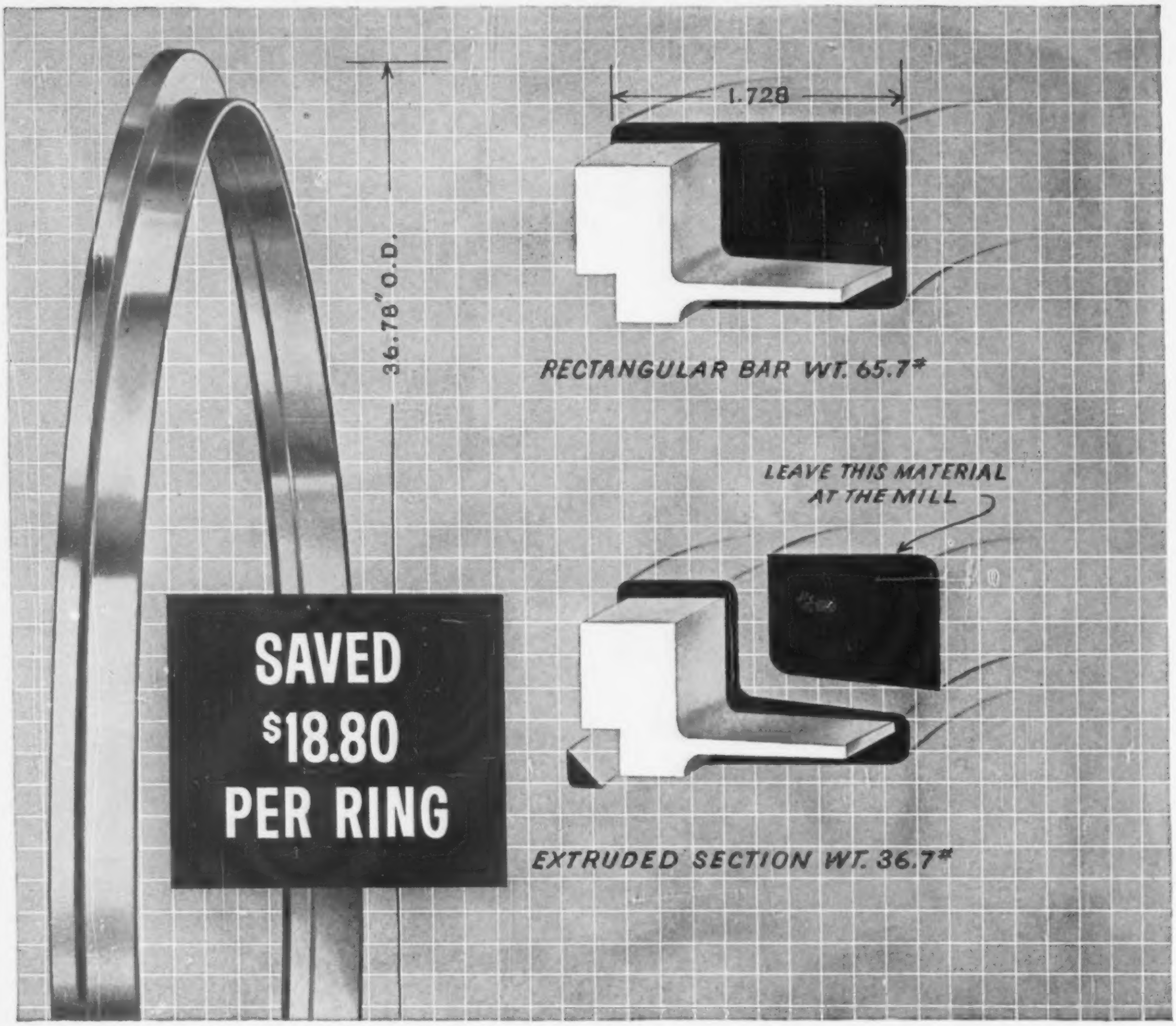
A delay in production caused by an "out-of-stock" part can make that part the most expensive item in your stock. IBM RAMAC 305 gives you the fast and accurate control over inventory that helps you avoid costly shortages—or equally costly overstocking.

As each transaction is entered into RAMAC, all affected records are immediately posted and updated. Management may inquire as to the status of any specified item in inventory. This random access ability is an exclusive feature of the IBM RAMAC.

Balanced Data Processing . . . IBM services as well as machines . . . is a continuing responsibility of IBM to its customers. Like all IBM data processing equipment, RAMAC 305 may be purchased or leased.

IBM®

balanced data processing


1.728
36.78" O.D.
RECTANGULAR BAR WT. 65.7#
LEAVE THIS MATERIAL AT THE MILL
SAVED $18.80 PER RING
EXTRUDED SECTION WT. 36.7#

Flash butt-welded rings cut the amount of stainless 321 required by 50%

Using a special extruded section, 29 lbs. of stainless 321 were eliminated —plus the extra hours of expensive machining required to hog it out.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 120 DIETZ ROAD • WARREN, OHIO

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Commercial Tubing

A pocket-size pamphlet lists a complete range of tubing products. It covers sizes, lengths and tempers, as well as the scope of the company's facilities. (Wolverine Tube Div., Calumet & Helca, Inc.)

For free copy circle No. 9 on postcard

Variable-Pitch Sheaves

Spring-loaded and manually-controlled types of variable-pitch sheaves can be adapted to nearly any machine by using a single V-belt. The spring-loaded sheave may be used as a replacement for an ordinary sheave—simply by adjusting center distance. (Browning Mfg. Co.)

For free copy circle No. 10 on postcard

Iron Castings

Engineered facilities and services, used in the production of castings from a wide range of iron alloys, are presented in a 12-page brochure. The brochure also contains a useful comparative-properties chart and description of the standard, high-nickel and ductile irons produced. (Hamilton Foundries Inc.)

For free copy circle No. 11 on postcard

Bridge Cranes

A comprehensive and information-packed four-page folder describes top-running, single-bridge, hand-traveling cranes. These cranes, available in capacities of 1 to 10 tons and in spans up to 50 ft in length, when combined with the manufacturer's hand or electric hoists, provide excellent installations where spotting of loads is more important than travel speeds. Features of construction such as end trucks, bridge beams, rail sweeps, tread wheels, wheel axles, drive gears and specifications such as weights, capacities and dimensions have been listed in detail. (Wright Hoist Div., American Chain & Cable Co., Inc.)

For free copy circle No. 12 on postcard

Throw-Away Tools

Standard lines of carbide throw-away and on-end inserts, blanks and brazed single-point tools are covered in a 36-page booklet. Complete specifications are given on square, round, triangular and diamond shaped throw-away and on-end inserts. All data are shown for a wide variety of carbide blanks and brazed tools. Pricing information is included. (Wesson Co.)

For free copy circle No. 13 on postcard

Plant Location

Authoritative and helpful, a new booklet explains the benefits of locating in Pennsylvania. It tells of plant location services for manufacturers, distributors, engineering firms and management consultants. Advantages of setting include: labor, markets, transportation, industrial sites, financing, production materials, minerals, water supplies, fuel, existing industry. (Pennsylvania Dept. of Commerce)

For free copy circle No. 14 on postcard

Air Tools

A complete line of grinders, sanders and wire-brushing tools are described and illustrated in a 10-page catalog. Of particular interest to production and plant-management officials is a special section of suggestions on how to get the maximum output of work from various types of air tools. (Master Power Corp.)

For free copy circle No. 15 on postcard

Fire-Control Chart

An 8½- by 11-in. chart explains the three classes of fires—and the approved extinguishers which should be used to fight each class. The chart shows the latest ex-

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **4/28/60**

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BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77, Village Station
NEW YORK 14, N. Y.

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tinguishers and provides detailed information on each. This chart is an updated version of an earlier chart which was widely used in training programs. (Walter Kidde & Co., Inc.)

For free copy circle No. 16 on postcard

Portable Torque Tester

Fully illustrated, a bulletin describes a complete line of portable torque-tension testing machines. It includes detailed instructions on accurate determination of bolt loads. It also explains how to check the reliability of power-tool output necessary for consistent tightening of threaded fasteners. The bulletin provides tabulated data which lists the ultimate tensile strength of bolts in various materials and sizes. The testers themselves are hydraulic devices—designed to eliminate bolt failures resulting from improper initial tightening. All instruments are certified within 2-pct accuracy. Three models are available to suit bolts from No. 10 to 2½-in. diam. Maximum capacity is 225,000 lb. (Skidmore-Wilhelm Mfg. Co.)

For free copy circle No. 17 on postcard

Tracer Mills

The great variety of work that can be done with hydraulic tracer mills is illustrated in an eight-page catalog. Also shown are the wide choices of tracer mills available. They range from completely automatic to manual tracers in one-, two- and three-dimensional models. (Famco Machine Co.)

For free copy circle No. 18 on postcard

Potentiometers

A two-page data sheet describes single-range and dual-range portable temperature potentiometers. It also discusses their advantages in making accurate temperature or millivolt measurements in industrial plants or in research laboratories. A simplified range-change method is described and all 24 interchangeable temperature and millivolt ranges are tabulated. Complete specifications are listed and ordering instructions are included. (Leeds & Northrup Co.)

For free copy circle No. 19 on postcard

Vertical Drive Units

A new line of variable-speed magnetic drives has been designed expressly for pump applications. Built in vertical configurations, these units are matched to fit standard vertical motors. The drives are air cooled. Speed variation is between 0-1740 rpm. Horsepower range is 3-310 hp. An automatic speed-control circuit forms part of the drive package. (Electric Machinery Mfg. Co.)

For free copy circle No. 20 on postcard

Cement Gun

A cement gun, for gunning refractory mixes in diverse applications, is described in a four-page brochure. Speed, control, one-shop application and other advantages are stressed. (Cement Gun Co.)

For free copy circle No. 21 on postcard

Forming Machines

A products catalog describes and illustrates three new high-speed forming machines. These machines are reported to be opening broad horizons in forming metal parts. The catalog also describes complete plant facilities for special machining and parts manufacture. (The Cyril Bath Co.)

For free copy circle No. 22 on postcard

Gasoline Engines

Designed as a compact, high-horsepower driver for centrifugal-pipeline compressors, generators and liquid pumps, a two-cycle gasoline engine is fully described in an informative bulletin. Rugged construction incorporates a rigid, one-piece cylinder block, heavily-ribbed crankcase, huge computer-designed crankshaft, removable power-cylinder liners and a completely automatic, jet-air-started turbocharger. Models are built with 10, 12 and 16 power cylinders, rated at 4000, 4800 and 6400 bhp respectively. (Clark Bros. Co.)

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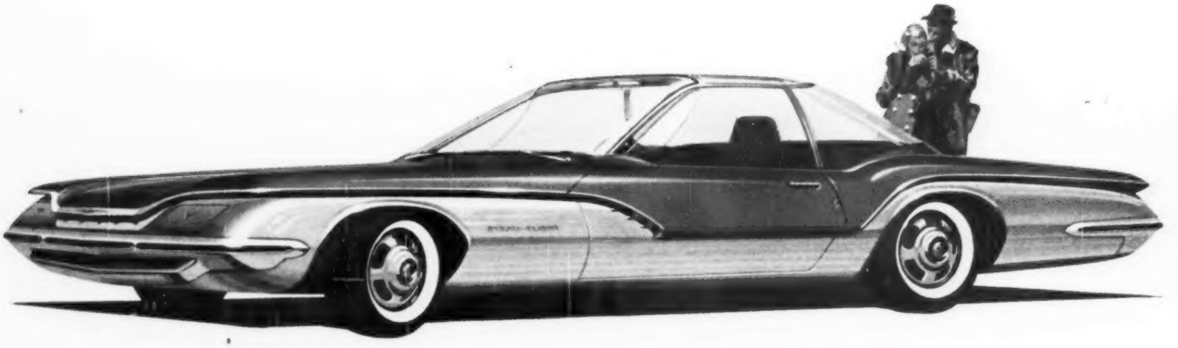
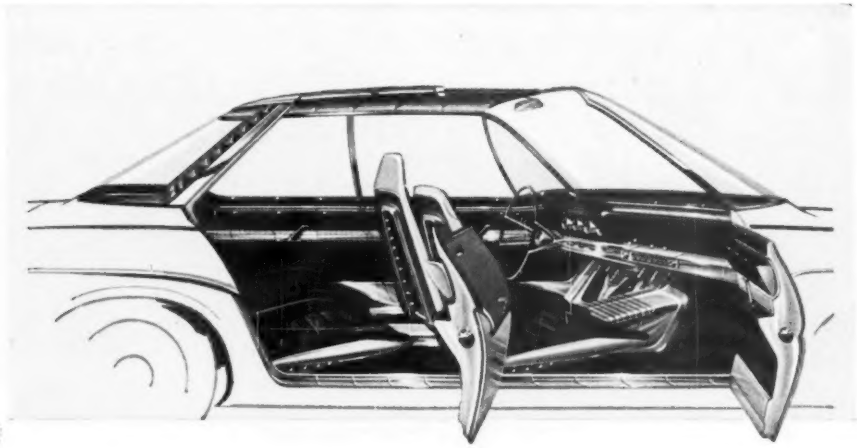


stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for AUTOMOBILES



McLouth Steel Corporation,
Detroit 17, Michigan

Manufacturers of high quality Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

McLOUTH STAINLESS STEEL

Eight 1664 cfm Fuller rotary units compressing to 120 psig in tandem sets to four 700 hp electric motors. Compressor plant supplies 13,200 cfm load to oil refinery—for air tools, machinery, and other pneumatic uses.

HOW FULLER ROTARY COMPRESSORS SAVE SPACE – CUT OPERATING COSTS, . . . at major eastern refinery

To save valuable space in the compressor plant, a large eastern oil refinery installed eight two-stage Fuller rotary air compressors—using a unique drive system. Because of the simple direct-drive through flexible couplings permissible with Fuller rotaries, the refinery was able to drive dual sets of compressors by single, 700 hp. electric motors.

While this means savings in space, the rotaries are also operating with cost-cutting efficiency. *In more than two years of service, these rugged compressors have required no down-time for repairs!*

Simple design, rugged construction and precision manufacture are the "secrets" of Fuller rotaries' dependability. The only moving parts are rotor, blades and bearings. There is no reciprocating action—hence no vibration. Smooth, quiet operation permits installation on light-weight foundations, on upper floors—saving in weight, bulk and cost of installation.

For full details on the maintenance-free economy and high performance of Fuller rotaries, write today for comprehensive, illustrated Bulletin C-5A.

C-343
1346

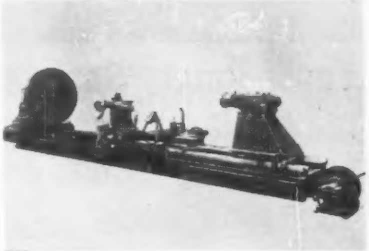
Fuller
. . . . pioneers in harnessing AIR

FULLER COMPANY
122 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

FULLER COMPANY
GENERAL AMERICAN
TRADE MARK

New Equipment and Machinery

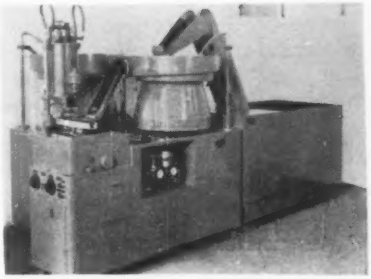
Lathe Provides Accuracy in Heavy Industry



Handling heavy work up to 40 tons, an engine and tracer lathe makes precision cuts to ¾-in. depth. It is available in four sizes with swings from 74 to 108 in. over the bed. The bed is 56-in. wide with four replaceable V-ways. The machine is designed for use in steel-mill maintenance, shipbuilding and repair, and in missile work. Traveling operator platform is part of the standard equipment. (The American Tool Works Co.)

For more data circle No. 34 on postcard, p. 127

Machine Fills Parts at High Production Rates



A line of automatic, high-speed filling machines injects viscous compounds into small components. The machines will fill circular openings in such components as drawn or molded shells of diameters up to 2 in.; and which lend themselves to automatic hopper feeding. The machine extrudes various types of mastic of putty-like consistency, in the form of a continuous band for injection into the components. Production rates range from 3000 to 18,000 units per hour. (Swanson-Erie Corp.)

For more data circle No. 35 on postcard, p. 127

Materials Supply Good Inspection for Defects

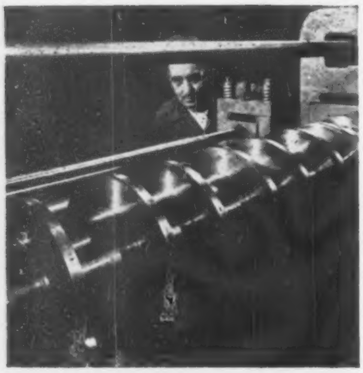
Magnetic-particle inspection equipment or test kits can use magnetic-particle inspection material available in pressurized spray cans or plastic squeeze bottles. The ready-to-use materials eliminate the problems of mixing to formula, and reduce set-up time to inspect complex parts. The materials are ideal for most in-place inspection of fixed equipment or rolling stock, wherever disassembly is costly. They make it quite easy to get into tight locations, or inspect inner surfaces. Each dispenser contains one pound of magnetic particles. (Magnaflux Corp.)

For more data circle No. 36 on postcard, p. 127

Cold-Heading Machine Produces Accurate Parts

Containing many new design features, a ⅛-in. high-speed, double-stroke, solid-die cold header achieves the speed of 450 pieces per minute. The 3/16-in. size machine makes 350 pieces per minute. The machines offer the following design features: Transfer finger and carry-over lever are designed for minimum inertial loads; the oscillating punch holder smoothly rotates about a point while locking positively in both cone and finish positions; a bushing-type solid cutter completely supports the wire, giving a clean square blank. (The National Machinery Co.)

For more data circle No. 37 on postcard, p. 127



Yoder Rotary Slitters reduce inventory... speed production

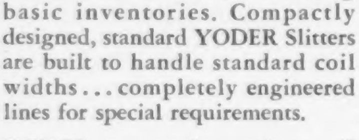
To help meet the demands of tight production schedules, YODER Slitters reduce mill-width stock quickly and economically to desired widths. If your needs are as low as 100 tons per month, time and manpower savings alone will offset the cost of your YODER Slitter in a matter of months, while reducing basic inventories. Compactly designed, standard YODER Slitters are built to handle standard coil widths... completely engineered lines for special requirements.

YODER accessories, such as coil cars, swivel unloaders, scrap choppers, scrap disposers, plate levelers and coil boxes, make stock handling fast and easy.

YODER also makes a complete line of Cold Roll-Forming equipment and Pipe and Tube Mills. To profit from YODER'S years of engineering and service experience, contact your local YODER representative or send for the YODER Slitter Manual.

Investigate the many advantages of YODER-engineered Slitter Installations. Write today for this comprehensive, 80 page YODER Slitter Manual... it's yours for the asking!

THE YODER COMPANY
5510 Walworth Avenue • Cleveland 1, Ohio

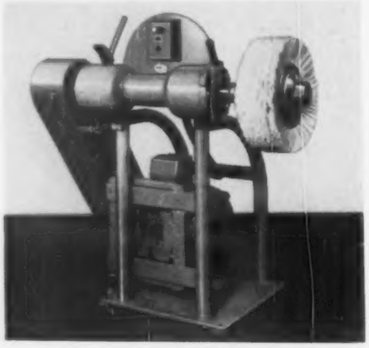


ENGINEERING YODER MANUFACTURING ROTARY SLITTING LINES

NEW EQUIPMENT

Low-Cost Lathe

Incorporating all the advantages of top-performance lathes, a new lathe eliminates excess cast iron and expensive inside-base adjustments. Practically the entire cost is apportioned to a top-quality spindle assembly. This assembly is mounted on a simple, sturdy structural base. The spindle, made of carbon alloy steel, runs in permanently-lubricated bearings. Lathe capacity is from 10 to 20 hp. Speeds may be varied by changing the motor sheaves. Distance from spindle housing to inside wheel flange is 8 in. (Murray-Way Corp.)



For more data circle No. 38 on postcard, p. 127

Cleaning System

Based on a sandwich-type transducer, an ultrasonic cleaning system is available in both high- and medium-intensity versions. Standard tank capacities range from 2 to 75 gallons, consuming 150 to 2000 w. The heart of the new system is a lead-zirconate-titanate transducer, designed to operate at 25 kc. The cleaner provides high cleaning efficiencies. (Branson Ultrasonic Corp.)

For more data circle No. 39 on postcard, p. 127

Precipitator

Removing objectionable pollution from shop air, an oil-mist and fume precipitator consists of a blower, a filter, and an electrostatic precipitator. These components remove the polluted air to improve working conditions. Collected coolant from machine-tool operations can be returned to the machines for reuse. Air exhausted from a precipitator unit is recirculated to the shop, thereby reducing heating and air-conditioning costs. The mist precipitator requires only a simple ductwork to the machine tool or the welding booth, so as to collect the polluted air from those operations. (Air-Maze Corp.)

For more data circle No. 40 on postcard, p. 127

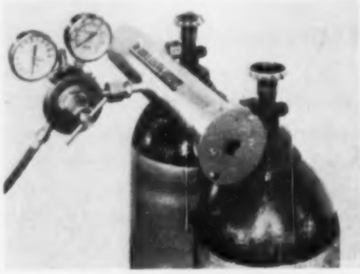
Gage Tester

A pressure-gage tester comes complete with tools for correcting faulty gage readings. Its simple design and operation make it easy for any person to check a gage reading, against that of the accurately-calibrated pressure-gage tester. Complete instructions are included with each kit. (Consolidated Siphon Supply Co., Inc., Terriss Div.)

For more data circle No. 41 on postcard, p. 127

CO_2 Manifolds

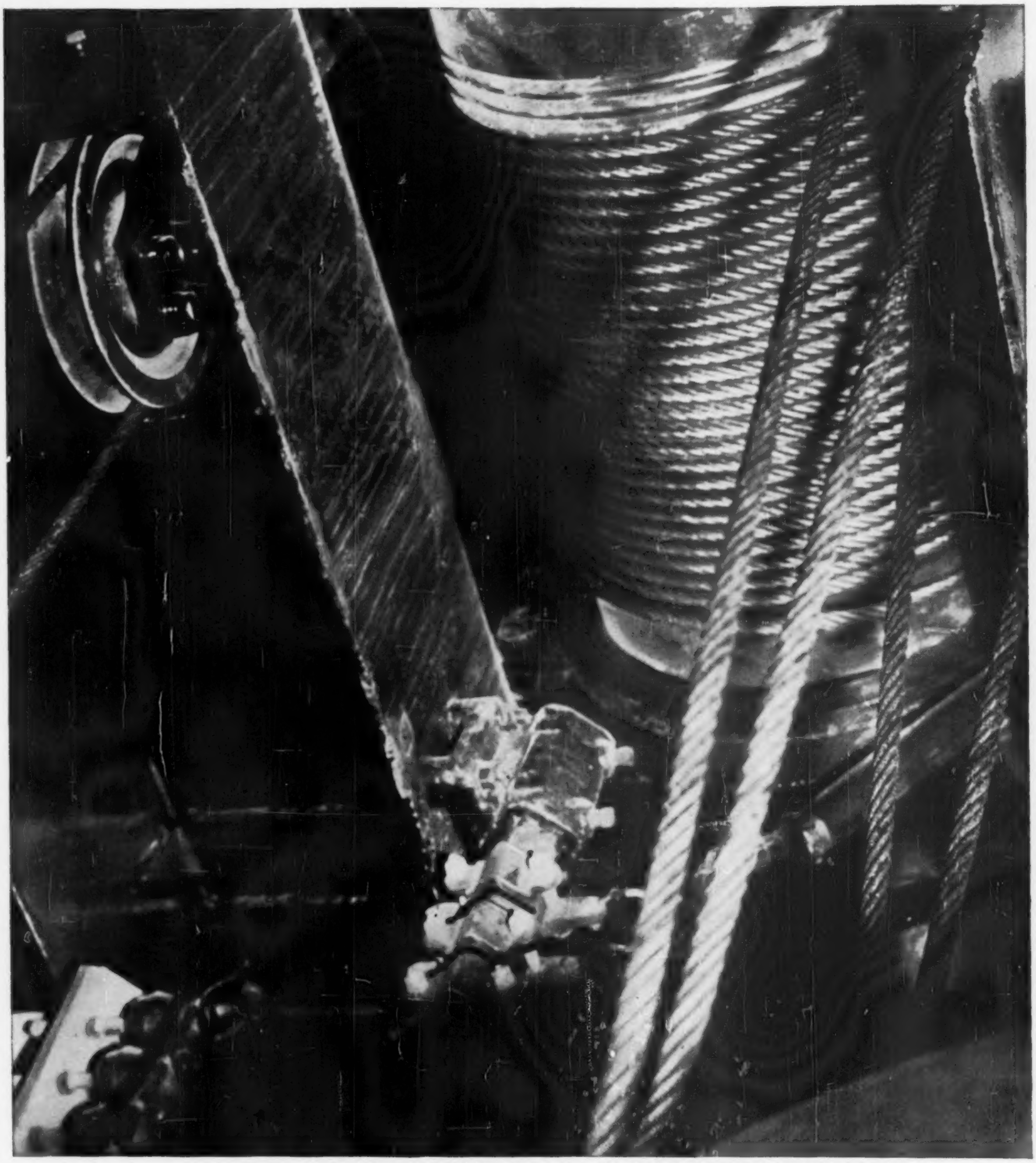
Electrically-heated CO_2 manifolds prevent regulator freeze ups, while helping cut gas consumption during welding operations. Different sizes are available for two- and four-bottle systems. Both manifolds are self-contained, one-piece units designed to work with any set of standard regulators. They come equipped with all necessary fittings, gaskets, and electrical wiring. (World Electric Co.)



For more data circle No. 42 on postcard, p. 127

Test Chambers

Operating from −100° to +600°F, a line of environmental test chambers is cooled with liquid CO_2. Rapid pulldown enables shock testing. Available in four



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sizes from 1- to 8-cu ft working capacity, the chambers are fully sealed against moisture, and are equipped with silicone door gaskets. High-volume forced-air circulation insures accurate operation. All models come with indicating thermostatic controllers and CO_2 cylinder connections. (Gruenberg Electric Co., Inc.)

For more data circle No. 43 on postcard, p. 127

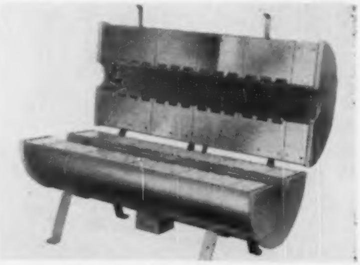
Feed Drill

Producing clean, precisely-located holes, a line of mechanical feed drills has a wide range of feed and speed adjustments. Holes drilled with the feed drills seldom need reaming. Even when drilling at difficult angles, holes can be precisely located. The unit consists of an air motor powering the positive feed mechanism. The twist drill is automatically fed into the material being drilled at a predetermined rate until a pre-set depth is reached. Five rates of speed are obtainable —2-, 3-, 4-, 6-, and 8-thousandths inch per twist-drill revolution. The drills are available in 12 drill speeds from 450 to 4500 rpm, two power ranges, and 0 to 5/16-in. drill-chuck capacity. (Ingersoll-Rand Co.)

For more data circle No. 44 on postcard, p. 127

Tube Furnaces

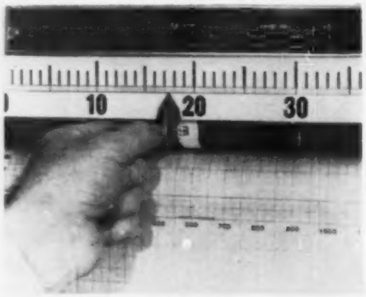
Operating at temperatures of 2200°F, a line of combustion-tube furnaces features vestibules on each end of the heating chamber. These vestibules reduce the heat losses, and effectively extend the length of the uniform hot zone. Heat source is a helical coil high-temperature alloy heating element mounted in semi-cylindrical refractories. Furnaces operating at temperatures to 1850°F are also available. The furnaces may be used in either a vertical or horizontal position. (Hevi-Duty Electric Co.)

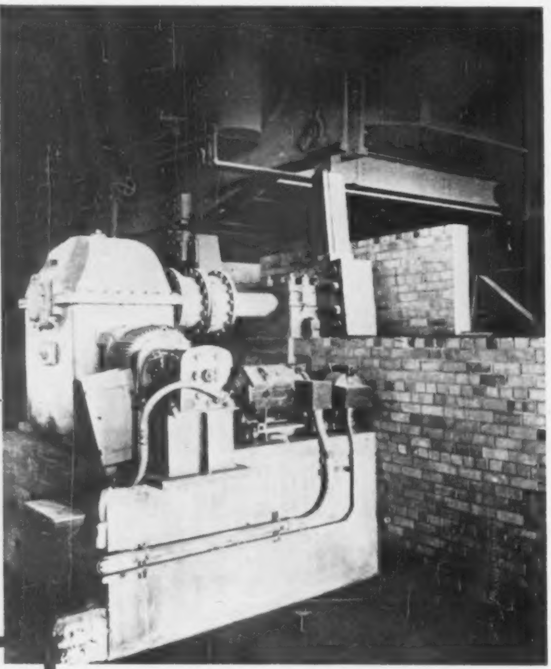


For more data circle No. 45 on postcard, p. 127

Multipoint Recorder

A multi-point strip-chart recorder easily converts to change the number of points being measured, the actuation or the range. It is designed for application in laboratories and in industrial processes where frequent record changing is required; or where it may be desirable to change the type of primary element or range of mea-



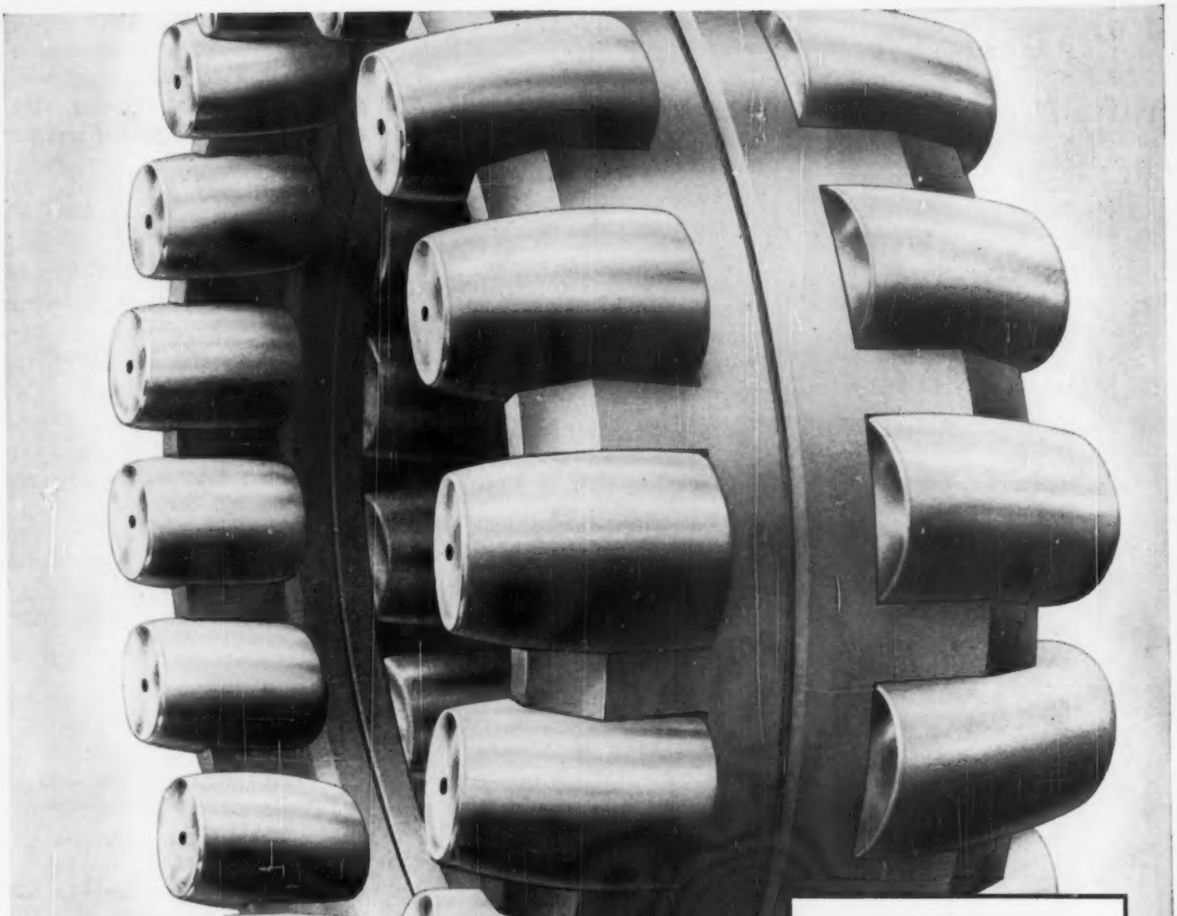

Tilting 700-tons of steel furnace

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.



"Caged" for Longer Life!

The two land-riding cages in Torrington Spherical Roller Bearings assure proper roller spacing and guidance, even under rugged conditions of shock load and sustained high speeds. These fully machined cast bronze cages operate independently. Their design eliminates drag on rollers. These high-strength cages help bearings give longer life by providing low friction, smooth running and cool operation. Highly effective and generous lubrication of all contact surfaces is achieved with the open-end cage design.

The result: Torrington Spherical Roller Bearings are built to give extra years of unmatched service life in heavy-duty applications. Torrington's long experience in design, engineering and manufacture of every basic type of anti-friction bearing provides the finest spherical roller bearings available. You'll find it pays to standardize on Torrington.

Superior design features of TORRINGTON SPHERICAL ROLLER BEARINGS

- integral guide flange for roller stability
- asymmetrical rollers seek flange for positive guidance
- electronically matched rollers
- size-stabilized races
- fully machined land-riding bronze cages
- controlled internal clearances
- even load distribution
- inherent self-alignment
- long service life

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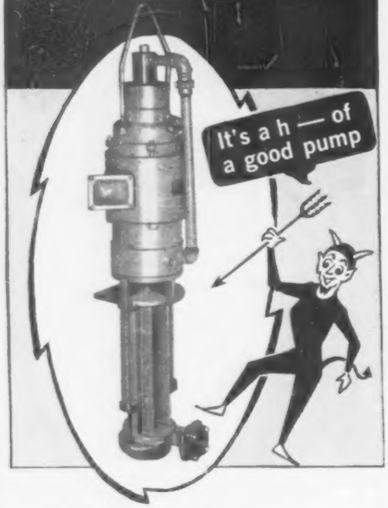
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surement. Measurements can be switched from 2 to 3, 4, 6, 8, 10, 12, 16, 20, or 24 points by simply changing a shorting plug and appropriate indicating and print wheels. Substitution of a new range card, terminal panel and scale changes actuation and range. (Brown Instruments Div., Minneapolis-Honeywell Regulator Co.)

For more data circle No. 46 on postcard, p. 127

Finishing Machine

Capable of performing 90 pct of all shop-finishing operations, a finishing machine has a removable end guard to permit inside contour-finishing operations on the idler drum. The combination belt and disk finishing machine is excellent for grinding, surfacing or polishing steel components, die castings, aluminum, brass and copper parts, and a variety of other materials. The unit can also sharpen tools. The machine also has a 9¾- x 16¼-in. table which gives ample work support for finishing large patterns. (Walker - Turner Div., Rockwell Mfg. Co.)

For more data circle No. 47 on postcard, p. 127

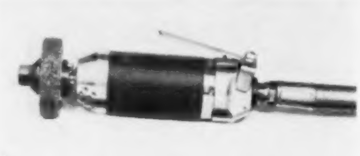
New Bronze Alloy

Nironze 635 is a new nickel-silicon-bronze alloy composed of 97.5-pct copper, 1.9-pct nickel and 0.6-pct silicon. In the ordinary hard-drawn state, Nironze has equal ductility with 2-pct silicon bronzes and superior ductility to 3-pct silicon bronze. At the same time, by proper aging, the newcomer develops a higher tensile strength than 2-pct silicon bronze. Most important, it exhibits a much greater yield than other silicon bronzes or even mild steels. Further, the elongation and reduction of area for the new alloy are very good. (Bridgeport Brass Co.)

For more data circle No. 48 on postcard, p. 127

Pneumatic Grinders

Small-wheel pneumatic grinders find use for driving small grinding wheels, rotary files, carbide burrs, and sanding and cutting disks. The grinders are intended for burring, die grinding and contouring, flash removal, snagging, weld smoothing, and other metal-removing operations. Speeds from 16,000 to 25,000 rpm are available. The grinders come in spindle and collet chuck models with lever, pushbutton, or ring-throttle control. (Thomas C. Wilson, Inc.)



For more data circle No. 49 on postcard, p. 127

Routers

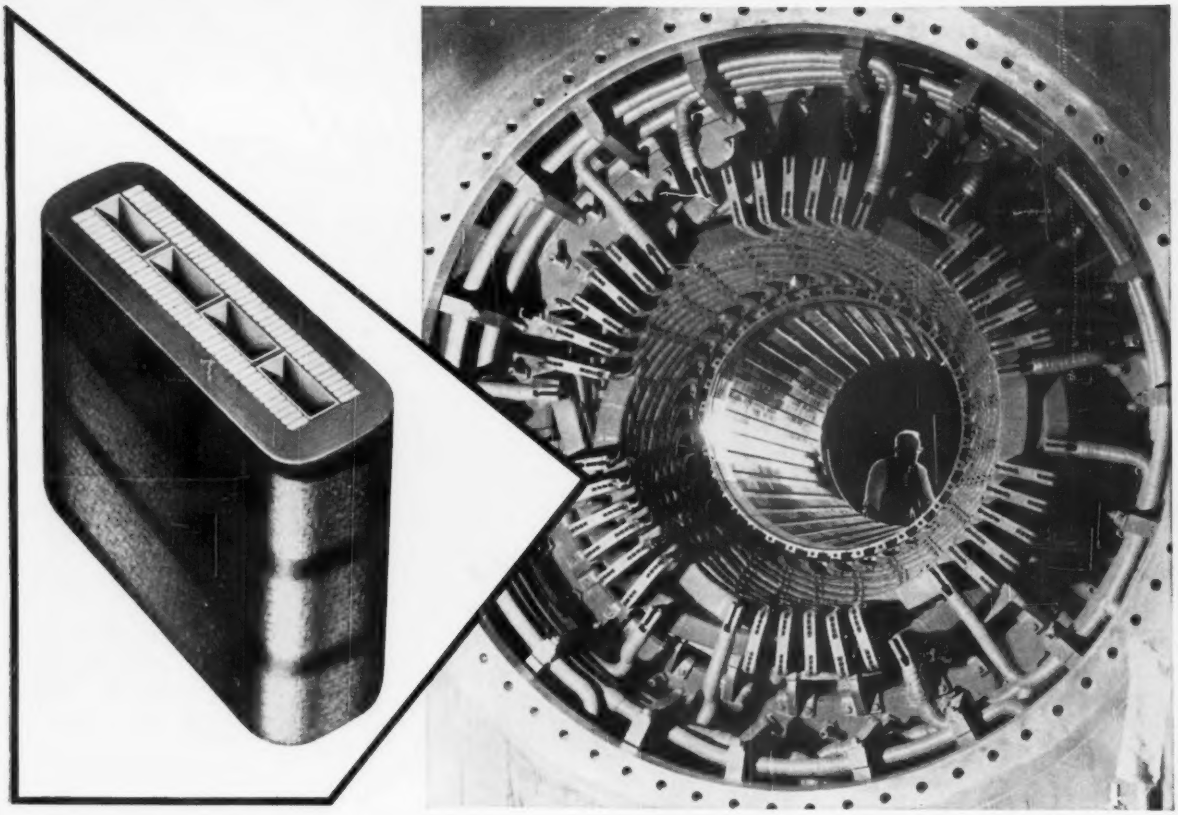
A family of air-powered routers range in capacity from ¼ to ½ in. collet, and in speed from 6000 to 15,000 rpm. Used for straight or contour cutting of wood, metal, plastic, and honeycomb, the router gives precise depth-of-cut adjustment. Other features include: self-cleaning operation and full-grip collet. (Buckeye Tools Corp.)

For more data circle No. 50 on postcard, p. 127

Surface Preparation

Fully automatic, a microtome prepares the surface of metallic specimens for microscopic study. The mechanism can be adjusted to advance the specimen in steps of as little as one micron. In many instances, the unit achieves a finish of sufficiently high quality for examination by microscope without polishing. (William J. Hacker & Co., Inc.)

For more data circle No. 51 on postcard, p. 127



Carpenter Stainless Tubing guides hydrogen coolant through giant, fully supercharged generators

Thin-walled, Carpenter stainless tubing ducts (flanked by copper stator coil strands and wrapped in mica tape) circulate hydrogen gas to cool this giant fully-supercharged turbine generator—one of the world's largest power plants.

Carpenter Type 304 rectangular stainless steel tubing was ideal for efficient, conductor cooling design.

(1) It was non-magnetic and prevented excessive heat build-up from a strong alternating magnetic field.

(2) Eddy current losses were reduced by the highly resistant stainless tubing.

(3) The thin-walled but strong Carpenter tubing allowed more room for copper in the stator coil with maximum conductor space inside tubing.

(4) In fabricating stator coils, thin-walled tubing was easier to bend.

(5) Rectangular shape conformed to coil construction and provided maximum heat transfer surface.

Most important, the 6000 ft. of Carpenter stainless tubing used in every generator had already passed the most searching quality control tests applied to stainless tubing anywhere. Dependable performance was assured.

Many types and forms of Carpenter stainless tubing are cutting costs and improving production in power plants all over the country. Call your nearby Carpenter representative for details or write: The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

your master key
to cost-savings
in power plants

Carpenter

Stainless Tubing & Pipe

News about the nation's leading steel plate specialist

Helping solve customers' problems is the job of Lukens' Technical Service Department. Here are four members: (left to right) Lou Keay, Metallurgist and Department Manager; Les Dawson and Harry McClure, Welding Engineers; Dick Rote, Metallurgist.

LUKENS EXPANDS SHOP & FIELD TECHNICAL SERVICE

In our shops we test materials for specific jobs. We develop fabricating procedures, welding techniques, flamecutting, forming, machining. We compile data. We keep building a fund of information that can help fabricators make better use of Lukens carbon, alloy and clad plate products.

What our Technical Service Engineers learn in our shop they take into your shop. Before, during and after a job, they're available to assist you.

Lukens has expanded its Technical Service—as we have all our other services—to keep pace with your needs. Write A-40 Services Building.

Lukens Steel Company, Coatesville, Pennsylvania.

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The Iron Age Summary

Steel Operations Headed Down

New order pickup only helps stem the tide and operations head downward to the 60's.

Order pickup must be weighed against the low levels of recent weeks. Orders now scarcely justify a 50 pct operating rate.

- Steel orders are holding steady, even picking up somewhat. But the industry operating rate is headed for further, sharp declines.

Throughout the late spring and into the summer months, the steel order picture will begin to follow the consuming pattern of the major steel users. The post-strike correction period is not over, but a slowing of cancellations and some new rush orders indicate the low point in new orders may be past.

Don't Overestimate — But there is a danger in overestimating the pickup in new orders that has been observed in recent weeks. The pickup must be weighed against the low rate of preceding weeks to be placed in proper perspective.

Here's an example: One mill reported a 30 pct increase in new orders in a recent period. But this gain brought the rate of incoming orders up to a point where they would support a mere 50 per cent of capacity.

How Far Gone?—The depths to which incoming orders had dropped in recent weeks is not fully realized. In some major mills, the rate of incoming orders had dropped to a level that was equivalent to only 35 pct of the mill's potential output.

And the leveling out of new orders to meet consumption comes at a time when metalworking is at the bottom of its seasonal cycle. Users are heading into their summer letdown period and the auto industry is getting ready to close out production of 1960 models and to move into the changeover period.

Into the 60's—As a result, it will not be surprising if the steel industry's operating rate falls into the mid or low 60's (as a per cent of capacity) in late June.

But there are indications of a possible good pickup in the second half. With inventories cut to the bone, steel users may have to come into the market in July and August for substantial tonnages. And, they will want quick delivery.

Pickup Possible—In fact, there are some signs that the new order outlook for June is better than May. If the market should bottom out next month, the second half outlook will be substantially better.

In anticipation of sudden new orders, mills are building up inventories of semi-finished steel in order to be ready for quick service when needed. This has been a factor in keeping the operating rate in the 80's in recent weeks.

Geared to Economy—The best that can be said for the market today is the pickup in some orders means that inventory control is coming to a halt and that the artificial factors have been eliminated from the market. Steel operations will reflect the overall economy.

A significant change in the market is that the cold-rolled sheet demand is weakening. Even galvanized and tinplate are showing some signs of losing strength.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,261	2,238	2,527	2,627
Ingot Index				
(1947-1949=100)	140.8	139.3	157.3	163.5
Operating Rates				
North East Coast	79.0	79.0*	87.0	93.0
Buffalo	82.0	84.0*	98.0	98.0
Pittsburgh	81.0	79.0*	86.0	94.0
Youngstown	60.0	63.0	79.0	85.0
Cleveland	82.0	87.0*	98.0	96.0
Detroit	94.0	83.0*	103.0	97.0
Chicago	85.0	84.0*	95.0	91.0
Cincinnati	90.0	92.0*	101.0	92.0
St. Louis	86.0	84.0*	101.0	108.0
South	79.0	79.0*	84.0	92.0
West	77.0	70.0*	75.0	92.0
U. S. Rate	79.4	78.5	88.7	92.8

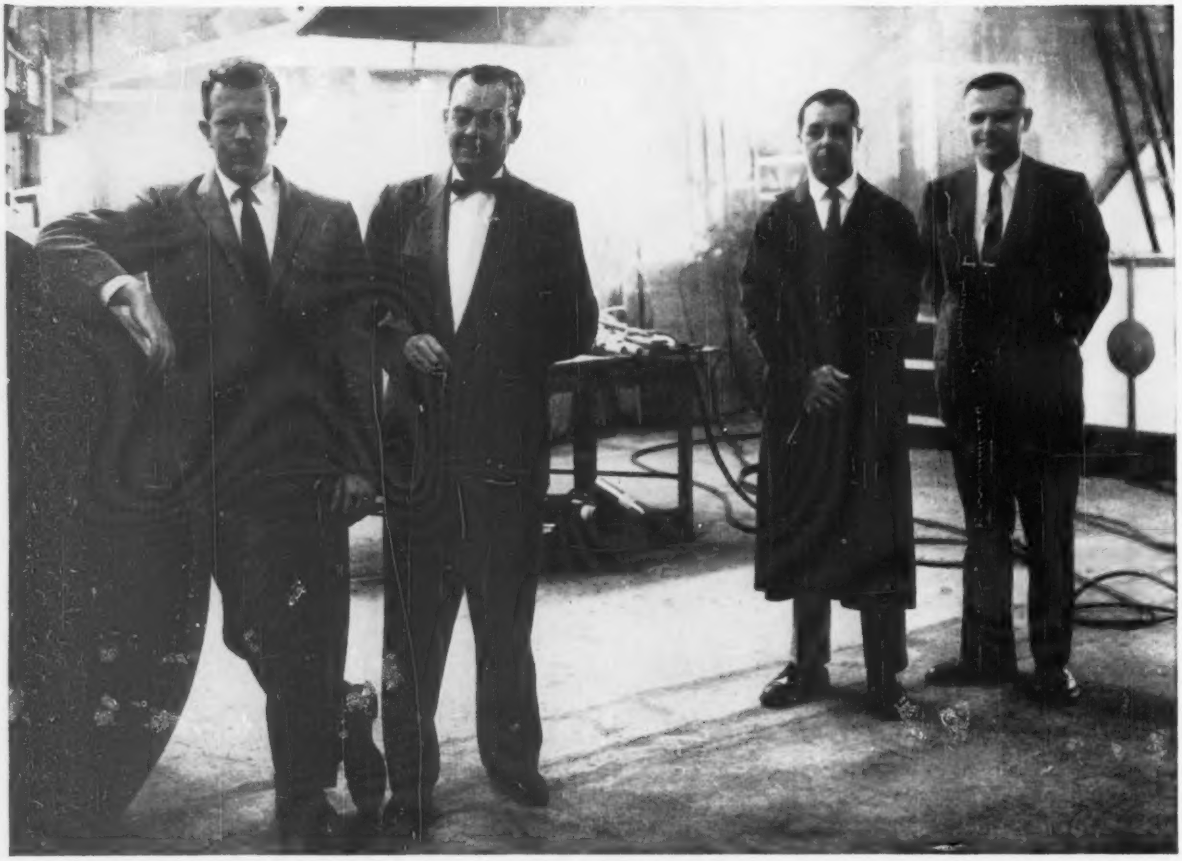
*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.50	$33.50	$33.17	$33.83
No. 2 bundles	$23.17	$22.83	$22.33	$22.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.25	99.00	99.75	102.50
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

News about the nation's leading steel plate specialist



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Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.25	99.00	99.75	102.50
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Local Buying Pays Dividends

Decentralized purchasing helps maintain a smooth running purchasing department.

Buying at local plants helps keep production efficient and keeps costs down.

■ "Everybody wants to be a purchasing agent. And purchasing people often rightly complain that other departments are usurping their authority," says Robert F. Kendall, director of purchases, Reliance Electric & Engineering Co., Cleveland.

"The only permanent solution to this problem is for us to serve others so well that they have no excuse to get into the act. We can't do this unless we are close enough to them to understand their problems and evaluate their needs," he says.

Major Buyer—Reliance is one of the major producers of electric motors, gear-motors, motor-generator sets, motor control systems, transformers, and electrical and mechanical variable speed drives. It has four plants in Ohio, one in Indiana and two in Ontario, and buys about $62 million annually.

"The same type of material around often is put into completely different uses," says Mr. Kendall. "With specially engineered products such as we make," he says, "tight specifications on some material may be a necessity in one plant and an extravagance in another. Such facts are slow to come to light and slow to result in action unless the P. A. is on the scene."

Team Effort—Material cost reduction must be a team effort, he feels, otherwise something gets overlooked or someone goes overboard in one direction or another. The best type of team allows the purchasing, manufacturing, and engineering people to work closely together, become familiar with each others' problems, and develop a mutual confidence in each other.

R. F. KENDALL: "Everybody wants to be a purchasing agent."

At Reliance each plant has a divisional purchasing agent, one or more buyers and a clerical staff. The P. A. is responsible to the division manager for material costs and for keeping the plant running, and to Mr. Kendall for matters of purchasing policy and vendor relations.

Where possible all production materials are bought at the local plant.

Danger Point—One of the dangers of decentralized purchasing is that the purchasing agents will lose touch with overall company policies and plans, and may become provincial in their thinking. Reliance tries to compensate for this by having meetings fairly frequently to discuss common purchasing problems.

The general purchasing department in Cleveland ties in closely with market forecasting, for example, and works with divisional personnel in setting inventory levels.

Unfortunate Aspect—Expediting problems are not unusual at Reliance. Unfortunately it is the nature of the electric control business that changes and refinements are likely to be made right up to the time of the start-up of the equipment.

Reliance's purchasing is in reality a hybrid organization, tailor-made for the company. It is now moving in the direction of centralizing purchases of non-production materials which can safely be bought on the basis of price and quality standards which are established at headquarters.

How to produce more hot metal in a hurry:

Win the race to boost hot iron production without the delay or expense of physical plant expansion. Island Creek engineers are ready to show you how Island Creek Precisioneered Coking Coals are currently helping increase production significantly in a number of leading mills... while actually lowering the net cost per ton of hot metal. You owe it to yourself to see the proof.

It is no longer just a theory. With the right coking coal, you can help increase hot metal production from existing coke ovens and blast furnaces. It's being done. Right now. Island Creek Coking Coals, from inherently better metallurgical seams, have a lower ash, sulphur and moisture content. Result: improved coke yield and throughput and a stronger coke, with more effective carbon. You use less coke, therefore, per ton of iron, save more furnace space for producing hot metal. And while you're getting this increased production, you're getting lower net costs. Island Creek has the tools (including a modern carbonization laboratory with test oven of full commercial width) to evaluate coking characteristics of coal blends and predict, in advance, results you'll be able to prove in a test run. Phone or write. No obligation.

P.S. TO STEAM COAL BUYERS
An Island Creek Precisioneered Coal may help you lower your cost per 1000 pounds of steam.

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Delivery Promises Keep Shrinking

Mill shipping estimates are still contracting—down one to two weeks since last month.

Sheets, bars, plates, and shapes are among the products affected.

▪ Mill delivery promises are still contracting.

Since last month's check by The IRON AGE, shipping estimates have dropped another one to two weeks. (See table below.) Practically all products and all districts are affected.

The growing weakness in sheet products has reduced delivery times at East Coast, Pittsburgh, Cleveland, Detroit, and Chicago area mills. Hot-rolled and cold-finished bar deliveries have also declined, especially in the Eastern and Pittsburgh areas.

Construction Steel Slow — The heavy steel market shows the effects of reduced orders for plates and shapes. Standard structurals are available in 1-4 weeks in some markets. Sheared mill plate is in the same position.

The continued lag in construction steel orders is hurting sales of plates and shapes. Shipbuilding work is at a minimum, especially in East Coast areas. Tank fabricating jobs are scarce. Freight car building is still at good levels, but the steel being used was shipped some time ago.

Other steel products reflect the slower market. Merchant wire products can generally be shipped from stock. Buttweld and seamless pipe are also stock items. Oil country goods are usually available for fast delivery.

Sheet and Strip—Sheet mills report a slowdown in orders over the past three weeks. Hot-rolled sheet is a little weaker than cold-rolled. But the lack of order interest is general. Even galvanized sheet orders for June have fallen off. **Eastern** mills are waiting for regular buyers to approve June tonnages of cold-rolled sheet. Although the usual 45-day lead time has passed, mills are still watching for these orders to come in.

Detroit area mills say sheet is not filling in very well on May books. But this was expected because of auto production cutbacks and efforts by car makers to pare down inventories. At **Chicago** both hot- and cold-rolled sheets can be obtained in three weeks time. Some **Eastern** mills are pushing hard for sales in that area.

Plates and Shapes — Mills are generally wide open for all heavy steel orders. The exception is wide flange beams which are still tight in the **Midwest.** Both standard shapes and sheared mill plate are available in 2-4 weeks or less from **East Coast** and **Pittsburgh** mills. Both grades are available in three weeks at **Chicago** area mills. The market there is very soft, but shows some scattered signs of improvement.

Bar — May bookings for many bar mills show a drop in orders. Prospects for June are discouraging. **Pittsburgh** mills say most products are available in two or three weeks time. Order books of **Chicago** mills are weak in both hot-rolled and cold-finished bar. Cold-drawers there and elsewhere are beginning to accumulate good in-plant stocks of finished material. Because the strike cleaned out cold-finished stocks completely, this market has been slower coming back. But now it's caught up with other products.

Tinplate — Most mills are still under heavy day-to-day pressure for delivery of tight items. April shipments are running at the par with those of March. May tonnage is solidly booked. June orders are coming in at a good rate. Mills expect some tapering off in the second half. But the prospects of a good production year remain unchanged.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	4-5 wks	4-5 wks	4-6 wks	4-6 wks	3-5 wks	8 wks
HR Carbon Sheet	3-4 wks	2-3 wks	2-4 wks	2-4 wks	3-5 wks	4 wks
CR Carbon Strip	4-5 wks	4-5 wks	4-6 wks	4-6 wks	4-6 wks	8 wks
HR Carbon Strip	3-4 wks	2-3 wks	2-4 wks	3-4 wks	3-6 wks	4 wks
HR Carbon Bars	1-4 wks	1-3 wks	6-8 wks	3-8 wks	3-4 wks	1-2 wks
CF Carbon Bars	2-4 wks	1-3 wks	5-6 wks	Stock	3-6 wks	2-4 wks
Heavy Plate	1-4 wks	2-3 wks		8 wks	4-5 wks	6-8 wks
Light Plate	2-3 wks	2-3 wks	2-4 wks		3-5 wks	6-8 wks
Merchant Wire	Stock	Stock	2-4 wks		Stock-4 wks	2 wks
Oil Country Goods	Stock	Stock	1-4 wks		Stock-6 wks	
Linepipe	Stock	1-4 wks	1-4 wks		4-8 wks	8 wks
Buttweld Pipe	Stock	Stock	2-4 wks	Stock	Stock-4 wks	1 wk
Std. Structurals	1-4 wks	2-3 wks	4-6 wks	1-8 wks	3-4 wks	4 wks
CR Stainless Sheet	1-4 wks	Stock-4 wks	Stock-6 wks	Stock-5 wks		
CR Stainless Strip	Stock-1-4 wks	Stock-4 wks	Stock-6 wks	Stock-5 wks		

COMPARISON OF PRICES

(Effective April 26, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Apr. 26 1960	Apr. 19 1960	Mar. 29 1960	Apr. 28 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled trip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Apr. 26 1960	Apr. 19 1960	Mar. 29 1960	Apr. 28 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$34.50	$35.50
No. 1 steel, Phila. area	34.50	34.50	34.50	33.50
No. 1 steel, Chicago	31.50	31.50	30.50	32.50
No. 1 bundles, Detroit	30.50	30.50	30.50	29.50
Low phos., Youngstown	36.50	36.50	38.50	38.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	52.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	52.50	52.50	52.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.50	$33.50	$33.17	$33.83
No. 2 bundles	23.17*	22.83	22.33	22.83
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	99.25*	99.00	99.75	102.50
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Dealers Show Some Price Resistance

Even with sales limited, dealers are balking at efforts to drop prices.

Generally, it's a reflection of the depressed state of a market where supplies are drying up with low prices.

▪ Dealer resistance to lower prices is growing.

In a market with domestic trading limited, many prices are untested. But mill offers to buy at lower prices are not attracting much scrap. And the low prices are drying up supplies of secondary grades in some markets.

Export Stays Strong—However, the price resistance is not general. Some dealers are shipping long hauls to export areas. The movement amounts to distress selling.

Export orders continue to dominate the East Coast market. Movement in port areas is all toward the docks. Better domestic sales would probably boost prices, some traders say. The export orders have about cleaned out the available scrap.

Strong export sales are likely through June. After that the market probably will taper off.

Less Auto Tonnage—With dealer scrap cleaned out in Midwest areas, the auto lists due this week should control the market. Tonnages for May are expected to be below April levels. This drop in tonnage may also take pressure off prices.

Pittsburgh — The market continues to bump along on bottom with mills showing little interest in buying and dealers not much in selling at present prices. No. 2 bundles price is up $1 as dealers are being quoted $28 for shipment to a nearby district. Local yards are providing enough scrap to meet schedules on an old order for No. 1 heavy melting at $35.

Chicago—The market is thin and slow-moving. Stainless exhibited weakness, but dealer resistance continues strong. Offers to buy at lower prices are bringing in scrap in small quantities only. Industrial heavy melting moved at $34. Purchases of No. 2 dealer bundles are reported as low as $20. The order was small in quantity, offset by material moving at higher prices.

Philadelphia — The market pattern continues. Practically no domestic sales, but an active export market. Export prices are keeping a floor under the market. Brokers say any domestic buying would firm prices or push them up. Reason: Export is taking a good percentage of available scrap. Dealers far from the docks are shipping into the area to keep scrap moving. Strong export should continue for at least the next 60 days.

New York — A major broker dropped his price for steelmaking grades by $1 a ton. But there are many dissenters. However, it looks like the lower price will attract enough business to set the market.

Detroit—Industrial list tonnage for May is expected to be down about 15 pct from April. Chrysler, for one, is offering about 70 carloads less than a month ago. Fisher Body tonnage is holding firm in most cases. Smaller tonnage may offset pressure for weaker prices.

Cleveland — Dealer yards are fairly well cleaned out of prime scrap so that auto production scrap should dominate the market again. Cleveland area tonnage for May is about 23,000 tons, close to the April figure. Some auto tonnage is also coming into local mills by water from Detroit.

St. Louis—No. 1 and No. 2 heavy melting were marked down $2 as one mill dropped out of the market. Demand is now very limited. The outlook for the scrap trade is gloomy, with no relief in sight.

Cincinnati — Secondary grades are starting to dry up because low price is not enough to bring them out. So any demand will probably bring the price up. Areas mills are expected to be in the market for May, but requirements will not be high.

Birmingham—The cast market is showing strength, with No. 1 cupola and stove plate advancing $1 per ton. Otherwise, the domestic market remains slow, with the few sales reported within $1 either way of present quotations. A large consumer indicated it will be in the market early next month.

Buffalo — The market is quiet and no more activity is expected this month. Consensus is that the next sale will be close to current prices.

Boston — The market is unchanged and the story repeats that of the past several weeks. A little export and a trickle of domestic business. Activity is very slow.

West Coast—The market is at a virtual standstill. Scrap flow into yards is almost nil. Export to Japan is about the sole prop in the market.

Houston—The market is still in a depressed state. A district mill has cut its operating rate to about 70 pct of capacity. The mill has offered to buy only a small amount of No. 2 heavy melting and No. 2 bundles. Intake of scrap is slow.

An important message for the man who buys

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SCRAP PRICES

(Effective April 26, 1960)

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. punch'gs plate.	42.00 to 43.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ¼ in. and heavier	38.00 to 39.00
Low phos. 2 ft and under.	36.00 to 37.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lght.	45.00 to 46.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	39.00 to 40.00
Malleable	50.00 to 51.00
Stove plate	42.00 to 43.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	105.00 to 110.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings.	25.00 to 26.00
Low phos. 5 ft and under.	37.00 to 38.00
Low phos. 2 ft punch'gs.	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under.	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	45.00 to 46.00
Malleable	55.00 to 56.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast	36.00 to 37.00
Drop broken cast.	50.00 to 51.00

Youngstown

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	36.00 to 37.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.50 to 37.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	32.00 to 33.00
Low phos. punch'gs plate.	33.00 to 34.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	210.00 to 215.00
18-8 turnings	90.00 to 95.00
430 bundles	100.00 to 110.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	32.00 to 33.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	42.00 to 43.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	35.00 to 36.00
Stove plate	40.00 to 41.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	42.00 to 43.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Cast iron car wheels	40.00 to 41.00
Unstripped motor blocks	39.00 to 40.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Mixed bor. and turn.	9.00 to 10.00
Stoveling turnings	10.00 to 11.00
Clean cast. chem. borings.	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	40.00 to 41.00
Automotive cast.	47.00 to 48.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	65.00 to 70.00
430 bundles and solids	80.00 to 85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings.	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	44.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft. and under (foundry)	41.00
No. 1 cupola cast.	37.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	15.00
Shoveling turnings	17.00
Cut structural plate 2 ft & under	$41.00 to 42.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	26.00 to 27.00

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Brass Mills Follow Copper Upturn

The strengthening copper market has helped step up brass mill business.

The copper market is expected to hold good, and brass markets should do the same.

■ The strength which the copper market has been showing has finally reached down to the brass mills.

"It's amazing how much business has picked up in the last week or so," said the president of one of the major mills.

The nature of the pickup suggests that it will take more than a spot weakness to turn this trend.

Sources of Strength—This could be important. Brass mill markets derive much of their strength or weakness from the condition of copper markets. And many in the trade now feel much of copper's current firmness is coming from a diverse set of factors.

In secondary metals, the combination of export scrap buying and scrap dealers holding back metal in anticipation of higher prices is firming the market even further.

Two prime examples: European fabricators are worried that race riots may spread from South Africa north to the copper belt. They are shopping in the U. S. And some U. S. fabricators have been concerned over the possibility of labor troubles in some Chilean copper mines.

Wide Front—However, the surge of brass mill buying is over a wide front. It isn't believed that customers have increased their ordering too sharply. And no narrow market can be said to be primarily responsible for the improvement.

Also, there is no indication that fabricators are yet rebuilding their inventories. Most of the buying is for reasonably current use.

There is absolutely no danger of any squeeze, even on deliveries, from the brass mills. Most mills have good stocks of copper. And these inventories are usually maintained in semi-finished shapes so quick shipment can be maintained.

What's Ahead—What's the outlook for the rest of the year now that the long-awaited pickup in business has arrived?

The head of one mill notes that "just about four months of 1960 are shot. And before you know it the July slow period will be on us. We'll do all right from here on out. But there'll be no records set by brass mills this year."

Aluminum

First quarter reports for the three major U. S. producers are out. They paint a very bright picture for the industry this year.

Of the three only Reynolds seems to have had any trouble in the first quarter. Its $106 million sales in the first three months were five pct under the same period last year. However, in the first quarter 1959 Reynolds delivered $12 million in metal to government stockpiles. These "put" rights ran out in 1959.

Sales Up—Reynolds' commercial sales increased. But company president Richard S. Reynolds, Jr. notes they were 16 pct under what the company had expected. He blames price hedging in December which took business that otherwise would have gone into January and February.

Frank L. Magee, president of Aluminum Co. of America, told stockholders late last week that the company had done 18 pct better in income in the first quarter than in the same period in 1959. Sales and operating revenues totaled $221,177,053 for an income of $12,635,046.

More Consumption—Mr. Magee said he felt "all signs point to an increase of approximately 10 pct in U. S. consumption of aluminum over 1959." He expects Alcoa's tonnage sales to be up 5 to 7 pct.

D. A. Rhoades, president of Kaiser Aluminum & Chemical Co., said domestic shipments by his company during the first quarter 1960 were lower than had been expected. He also assigned the blame to late 1959 hedging.

However, Kaiser's first quarter sales were up to $111,085,000 from $97,247,000 in the first quarter 1959. And earnings in the first three months this year were $7,297,000, up from $4,206,000 in the same period last year.

Tin prices for the week. April 20—98.875; April 21—98.875; April 22 — 99.125; April 25 — 99.25; April 26—99.375*.
*Estimates.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 149.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	5/16-⅝	¾-1	1⅛-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	50.13	....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	....	48.68	58.78
Muntz Metal	53.20	....	48.26	....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	....	52.21	....
Phos. Bz. 5%	77.44	....	78.19	....

Free Cutting Brass Rod	36.08

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$74.75
Beryllium copper, per lb conta'd Be	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$71.50
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.50
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined	29.95 to 36.95
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury, dollars per 76-lb flask f.o.b. New York	$213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel	69.60
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per kg.	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	29.25
No. 120	28.25
No. 123	27.25
80-10-10 ingot	
No. 305	33.75
No. 315	31.50
88-10-2 ingot	
No. 210	42.00
No. 215	38.75
No. 245	34.00
Yellow ingot	
No. 405	23.75
Manganese bronze	
No. 421	28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	25.75-26.00
0.60 copper max.	25.50-25.75
Piston alloys (No. 132 type)	28.00-29.00
No. 12 alum. (No. 2 grade)	24.75-25.25
108 alloy	25.25-25.75
195 alloy	27.75-28.75
13 alloy (0.60 copper max.)	25.75-26.00
AXS-679 (1 pct zinc)	25.00-26.00

(Effective April 25, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	25.25-26.25
Grade 2—92-95%	24.00-25.00
Grade 3—90-92%	23.00-24.00
Grade 4—85-90%	22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27
No. 2 copper wire	25
Light copper	22¾
*Refinery brass	23
Copper bearing material	22

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27
No. 2 copper wire	25
Light copper	22¾
No. 1 composition	21½
No. 1 comp. turnings	21
Hvy. yellow brass solids	15½
Brass pipe	14¾
Radiators	16½
Aluminum	
Mixed old cast.	15 —15½
Mixed new clips	16½—17
Mixed turnings, dry	15½—16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23 —23½
No. 2 copper wire	20 —20½
Light copper	18 —18½
Auto radiators (unsweated)	12½—13
No. 1 composition	16½—17
No. 1 composition turnings	15½—16
Cocks and faucets	13 —13½
Clean heavy yellow brass	11¾—12¼
Brass pipe	13½—14
New soft brass clippings	14 —14½
No. 1 brass rod turnings	11½—12

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	11¼—11¾
1100 (2s) aluminum clippings	15 —15½
Old sheet and utensils	11¼—11¾
Borings and turnings	7 — 7½
Industrial castings	11¼—11¾
2020 (24S) clippings	12½—13

Zinc

New zinc clippings	7 — 7¼
Old zinc	4½— 5
Zinc routings	3¼— 3½
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	28-29
Clean Monel turnings	20-23
Old sheet Monel	24-26
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	75 —76
No. 1 pewter	55 —56
Auto babbitt	39 —40
Mixed common babbitt	9¾—10¼
Solder joints	13¼—13¾
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. **Extras apply.**

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	**Bethlehem, Pa.**			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	**Alton, Ill.**								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	**Fontana, Cal.**	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	**Atlanta, Ga.**					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective April 25, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective April 25, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective April 25, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C4	Claymont Products Dept., Claymont, Del.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M6	Mystic Iron Works, Everett, Mass.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Chicago, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Steel Corp., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago.
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	......	......	......	......	......	......	......	......
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*7.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	......	......	......	......	......	......	......	......
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Fontana *K1*	*6.25	......	*2.25	......	0.75	......	1.25	......	1.75	......	2.25	......	2.75	......	......	......	......	......	......	......	......	......
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	......	......	......	......	......	......	......	......
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective April 25, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*)			Sheet (*I2*)
		10 pct	15 pct	20 pct	20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.50
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

	Per net ton
Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

	Per net ton
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective April 25, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	.....	9.00	9.55*
Chicago *N4***	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	.....	9.00	9.55
Cleveland *A6*	.....	.....	...	...	.....	.....	.....
Cleveland *A5*	.....	.....	...	...	.....	9.00	.....
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	...	...	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	.....	8.65	9.20
Worcester *A5*	179	.....	...	...	.....	9.30	9.85
Williamsport *S5*	.....	.....	...	...	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.50
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	....
	2½	12	54.23	63.57	....
	3	12	62.62	73.40	....
	3½	11	73.11	85.70	....
	4	10	97.08	113.80	....

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Sponge Iron, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.	11.50
Electrolytic Iron, melting stock, 99.87 pct Fe	28.75
Carbonyl Iron	88.00
Welding Grades	8.10
Cutting and Scarfing Grades	9.85

Copper Powders

Molding Grades	
Electrolytic, domestic, f.o.b. shipping point.	15.00†
Atomized	46.5 to 64.5
Reduced	15.00†
Chemically Precipitated	15.00†
Brass, 5000-lb lots	35.1 to 52.2
Bronze, 5000-lb lots	53.1 to 56.7
Chromium, electrolytic	5.00
Lead	7.50†
Manganese, electrolytic	$1.00
Molybdenum	$3.60 to $4.35
Nickel	$1.15
Carbonyl Nickel, 20,000 lb lots	$1.01
Nickel-Silver, 5000 lb lots	60.7 to 69.0
Solder	7.00†
Stainless Steel, 316	$1.07
Tin	14.00†
Titanium, 99.25 + pct, per lb, f.o.b.	$11.25
Tungsten	$3.15 (nominal)

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† Plus cost of metal.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

Plain finish—packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

		Discount Hex	Square
Full Cartons		46	57
Bulk			
¼ in. diam or smaller	25,000 pcs		
5/16 or ⅜ in. diam		56	60
	15,000 pcs	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Strip Hot-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled (merchant)	Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	......	......	......	......
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		7.43	9.50	9.89	8.91	7.79	8.00	9.09	13.14	16.76	......	......	......
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	7.59	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.83	9.96	10.04	10.09	11.19	......	......	......	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	......	8.60	8.93	9.01	8.97	12.11	......	......	......	......
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	......	......	8.90	8.65	9.20	8.90	10.70	......	......	......	......
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.69	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	......	16.69	......	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective April 25, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	68.00	68.50	69.00		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50		
Fontana *K1*	75.00	75.50			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			66.50		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	68.00	68.50	69.00		
Monessen *P6*	66.00				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	
Sharpsville *S3*	66.00		66.50	67.00	
So. Chicago *R3*	66.00	66.50	66.50	67.00	
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*			66.50		

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective April 25, 1960)

DYKEM STEEL BLUE®
Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

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You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

Our modern tool and machine shop is constantly making new dies to add to the tremendous variety of screens available. If you have a special problem we'll gladly supply design and metallurgical assistance.

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.00	0.50% C	38.00
0.05% C	39.00	1.00% C	37.75
0.10% C	38.50	1.50% C	37.50
0.20% C	38.25	2.00% C	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si	37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si	28.25
0.025% C (Simplex)	36.75
5-7% C, 61-65% Cr, 5-8% Si	22.00
5% max C, 50-55% Cr, 2% max Si	25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

	Palmerton, Pa.		Neville Is., Pa.
Mn	10 lb, pig	35 lb, down	35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	14.60	75% Si	16.90
65% Si	15.75	85% Si	18.60
90% Si	20.00		

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb.	2.40	3.30	4.55

(Effective April 25, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads, bulk	9.85¢
Ton lots	11.20¢
Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	$1.50
Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound	
Ton lots	$3.45
Less ton lots	3.50
Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta	$3.40
Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo	$1.76
Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton	$120.00
10 tons to less carload	$131.00
Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	$1.54
Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$255.00
Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered	$2.15 (nominal)
Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa.	$1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.38
Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.	
Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢
Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5	$1.38
Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	
2000 lb carload	$5.50
Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, fo.b. Niagara Falls, New York, freight allowed, in any quantity per pound	30¢
Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.	
Ton lots per pound	18.25¢
Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots	$1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50
Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over	
No. 1	$1.05
No. 79	50¢
Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.	
Ton lots (packed)	$1.46
Less ton lots (packed)	1.57
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots	2.15

New Machine Repair Trend Growing

The trend of the builder rather than independent shops repairing machines is growing.

Reliance Electric & Engineering Co. is becoming a leader in the field.

▪ Some months ago Reliance Electric & Engineering Co. in Cleveland got a phone call from an excited dairy operator in town. The motor which ran his milk can washer had burned out. Dirty milk cans were piling up by the dozens. Farmers who were supposed to get them back were bawling him out because they didn't have clean cans for fresh milk. And the dairy's regular outside maintenance shop couldn't fix it in less than two days. Could Reliance repair it?

Reliance Equipment Service Div. kept some of its workers up all night. The motor was back in operation by morning. And the dairyman and his farmers were all happy.

Growing Trend—Repairs like this—by the motor builder rather than independent shops or plant maintenance departments—are a growing trend. Especially in continuous process industries where complicated motors and machinery are vital. And production downtime is costly.

Factory authorized repair shops have been a big business for years, of course. In time of floods or other calamity, they are frequently beefed up with factory personnel, too. And independent shops have flourished for years.

New Phase—A new twist was started in 1954, however, when Reliance put in a string of factory-owned field service shops in Ohio, Pennsylvania and West Virginia coal mining districts. This was done in conjunction with Joy Manufacturing Co. of Columbus, O., mining machinery builders. Other builders are also in it, and some independent shops are converting. Good inventories of about 12 types of direct current mine motors are carried.

"The business has just about tripled in terms of inventory of motors in the field shops, man-hours worked and income," says John Drollinger, Reliance manager. "We have been able to convince coal miners that by scheduled replacement and good servicing they can avoid having motors burn out miles underground and lose thousands of dollars worth of production waiting for it to be fixed. In an emergency we can get a rebuilt exchange over to the mine frequently as fast as they can get the old motor to the top of the shaft.

Sneak Preview—"In May or June we are going to announce another innovation—formal annual service contracts where we will act as technical adviser to mine maintenance men. It's all a part of our 'total service.' In many cases too, motors are rebuilt better than the original because of improved parts. Life is generally lengthened, sometimes doubled, by regular maintenance."

In addition to coal mine repair shops, the work is being expanded for auto plants and steel mills serviced out of the Cleveland plant.

ELECTRICAL POWER
EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New G.E.	Enc. S.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	Enc. S.V.	415	280
1	2250	New G.E.	Enc. S.V.	600	200/300
1	2200	G.E.	Enc. S.V.	600	400/500
2	2000	G.E.	Enc. S.V.	350	230/350
2	1750	G.E.	Enc. S.V.	250	175/350
2	1500	Whse.		600	500/700
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D8	600	600/900
2	900	G.E.	MCF	250	180/360
1	850	G.E.	MCF	250	85/170
2	800	G.E.	MCF	250	400/750
2	800	G.E.	MCF	250	780
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
2	645	S.S.	V.G.	300	1000
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	G.M.	DS	250	300/900
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	125	Cont. B.B.		250	1750
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

SWITCH GEAR

Large Stock Oil & Air C/BC can furnish in NEMA 1 Enc. or Open Magnetic or Manual Operation. What are your needs & I. C. Requirements.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	4800	G.E.	450	300	2300/4600
1	2400	G.E.	450	300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500 (New)	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	250	440
1	150	G.E.	1200	125	440
	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	S1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	34500 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475 x 2300/4000
2	750	G.E.	Pyranol	1	4800 x 85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	167	G.E.	HS	1	13800 x 240/480
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS

230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408 Shunt
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
9	125/165	G.E.	625/575	CO-1832 Ser.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

Above only partial listing of our available stock.

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BELYEA COMPANY, INC.
47 Howell St. Jersey City 6, N. J.
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110-lb. A.R.E.A. RELAY RAILS

with matching anglebars
and tieplates

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2000 tons from Chicago
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3 LEE WILSON RECTANGULAR BELL-TYPE ANNEALING FURNACES

atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14'. Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

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CAnal 6-2470

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

TYPICAL FOR MILL & REEL DRIVES

(2)—3500/3000-KW Al.Chal. 5-Unit Sets, (2) 1750-KW. Gen., 350/300—700/600-V.D.C., (1) 5000-HP Syn. Motor 13800/6900/4160-V., 3 ph., 60 cy., with exciters.
(1)—1325-KW Whse. 2-unit Set, Gen. 600-V.D.C., with 2250-HP Syn. Motor 2300-V., 3 ph., 60 cy.
(1)—1520KW 3-Unit Set, (2) 760-KW Gen., 600-V.D.C., (1) 2250-HP Syn. Motor, 2300-V., 3 ph., 60 cy.
(1)—200-KW General Electric 3-unit Set, (2) 100-KW gen. 250-V.D.C., with 300-HP Syn. Motor, 2300-V., 3 ph., 60 cy.

We can supply various Motors with these Sets, together with exciters and controls as a COMPLETE PACKAGE.

DIRECT CURRENT MOTORS
Adjustable and Constant Speed
(Suitable for MILL and STANDARD DUTY)

Qu.	HP	Make	Volts	R.P.M.
1	3000	G.E.	600	90/180
2—N-*	3000	Whse.	600	600
2—N-*	2700	G.E.	415	280
1—N-*	2500	Whse.	700	108/162
1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	300/700
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/1050
3	125	Whse.	230	350/1125
1—N-*	100	Whse.	250	350/700

N—New and unused.
*—Enclosed forced ventilated.

T. B. MAC CABE COMPANY
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ROLLING MILLS—STEEL WORKS EQUIPMENT

1—3-HIGH PLATE MILL 40" & 26½" x 112".
1—32" & 20" x 110" PLATE MILL, 3-high.
1—25" & 42" x 60" HOT STRIP MILL, 4-high.
1—24" x 36" 2-HIGH MILL driven by 400 HP motor, 4600/3/60.
1—22" x 36" 2-HIGH MILL driven by 600 HP motor, 46/3/60.
1—16" x 30" 2-HIGH MILL, with 400 HP motor and gear drive.
1—3¼" & 8½" x 5½" STRIP MILL, 4-high.
2—28" 3-HIGH ROLL STANDS.
1—18" 3-HIGH BAR MILL, single stand.
1—NEW 16" BAR MILL, 3-high, single stand.
1—10" BAR MILL with motor and gear drive.
1—9" BAR MILL 3-high, five stands.
1—34" x 192" ROLL GRINDER.
1—450 TON DOWN-CUT CROP SHEAR, 14" stroke, length of knives 28".
1—OPEN SIDE BAR SHEAR, Williams & White No. 14½, or 1¾" round.
1—SHEAR, 1" x 110" plates.
1—LEVELLER, 1" x 104" plates.
1—ELECTRIC MELTING FURNACE, 1-ton capacity, 800 KVA transformer.
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1—DRAWBENCH, 10,000 pounds, triple, 78'.
1—MAGNETIC SEPARATOR double pulley, Stearns.
1—SIDE TRIMMER, Streine, maximum width 48" makes 2 cuts 3/16" mild steel.
1—60" BACKED-UP ROLLER LEVELLER, work rolls 1½" dia.
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.
1—POINTER or tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, 7.5 to 1 ratio.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1,698 to 1.
1—3500 HP MOTOR, 11000/6000 volts, 3 phase, 60 cycle, 514 PRM., synchronous, never used.

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Will lease or sell all or part. Immediate occup. available. Write or call:

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No. 3⅛" capacity Gray Sheet Metal Cutter, m.d.
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No. 11 Warner & Swasey, m.d.

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No. 1 Warner & Swasey "Electric", m.d., bar
No. 1L Gisholt Universal m.d., 1943
No. 1A Warner & Swasey, m.d., late
No. 2 Bardons & Oliver Ram Type Electric, m.d.
No. 2L Gisholt, m.d.
No. 2H8, Libby, 1942
No. 3 Gisholt, m.d., 1945
No. 3A Warner & Swasey, m.d.
No. 3L Gisholt, m.d., 1943
No. 3AL Gisholt, H.D. Full Universal, with cross sliding turret, 1940
No. 4 Midland Universal Ram Type, m.d.
No. 4 Warner & Swasey Universal Ram Type, m.d.
No. 4 Gisholt, 1943
No. 4 Jones & Lamson Universal Ram Type, m.d.
No. 4 Morey Ram Type, m.d.
No. 4A Warner & Swasey Universal Hollow Hexagon, m.d.
No. 4A Warner & Swasey Universal, m.d., chucking, 1939
No. 4L Gisholt Universal, m.d.
No. 4FU Foster Fastermatic, m.d., latest, 1945
No. 4H-12 Libby, m.d.
No. 4R Libby Ram Type, m.d. in base
No. 4R Gisholt Universal Hollow Hexagon, m.d.
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Steel Underframe

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MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES
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DIESEL LOCOMOTIVES & CRANES

25 Ton Industrial 60' Boom Crane
12 Gen. Elec. 23, 25, 44, 65 & 80 Ton Diesel Elec. Locos.
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2—16,667 KVA General Electric unused 3 phase, 60 cycle primary voltages—88000/77000/44000/38500/22000 secondary voltages—11500/8600/5700/4300 taps—2 above and 4 below rated voltages.
3—1667 KVA Allis Chalmers 1 phase, 60 cycle outdoor 7200/12,470 volts primary, 2400 volts secondary.
2—1000 KVA Kuhlman 3 phase, 60 cycle, outdoor 13,500 volts primary, 260 volts secondary.
1—1000 KVA General Electric 3 phase, 60 cycle autotransformer, 2400/4160 volts primary, 2400/4160 volts secondary.
1—750 KVA Westinghouse 3 phase, 60 cycle outdoor 33,000 volts primary, 120/208 volts secondary.
3—333 KVA Westinghouse 1 phase, 60 cycle indoor 12,000 volts primary, 240/480 volts secondary.
3—250 KVA Allis Chalmers 1 phase, 60 cycle outdoor 11,500 volts primary, 480 volts secondary.
3—200 KVA General Electric 1 phase, 60 cycle, outdoor 13,200 volts primary, 2400/4160 volts secondary.
3—50 KVA Westinghouse 1 phase, 60 cycle outdoor 600 volts primary, 120/240 volts secondary.

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STEEL BARS AND TUBING

120 Tons
1¾" R.C.S. x 40", 1010
50 Tons
6-5/16" O.D. x 4-5/16" I.D. x 5'-10' R.L.
and
4-13/16" O.D. x 3½" I.D. x 5'
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NEVER USED
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"FASTER FROM FOSTER"

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Nation's Largest Warehouse Stocks

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PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
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5' x 12 Ga. Whitney Power Shear.
No. 3 Niagara Angle Bending Roll, M.D.
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No. ½, No. 1½ Buffalo Univ. Ironworkers, M.D.
600 Ton Southwark Hyd. Inclined Wheel Press.
6' x ¼" Lawn Initial Bending Roll, M.D.

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MACHINES FOR YOUR YARD

Lorain 20 ton truck crane
Amer. 50B 3-drum hoist w/slewer
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5x16 Telsmith Vibro King d.d. screen
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6'19" COL. CINCINNATI BICKFORD "SUPER SERVICE"

36 Speeds 21 to 1278 R.P.M.
18 Feeds .006 to .125 I.P.R.
#6 M.T.—P.R.T. of Head
20 H.P. Motor on Arm

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new 1953, model 34, Cat. diesel engine, electric starter, 30" pads, Fairlead, 35' basic boom, plus 2 boom sections 10' & 15', approx. wt. 25 tons, $10,000.00.

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Roller Hearth, 948 K.W. Capacity Equal to New Condition. 27" x 62" Opening, 112' long Convection Circulating Fans. Water Cooled—60' Cooling Chamber 5 ton per hour capacity. Air lock Purge Chambers, Frame Curtain, Max. Temperature 1700. (Chromax) 8000 CFH *Atmosphere* Generators.

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6" Medart Bar Turner
600 Ton Cleveland Knuckle Joint Press, 6" stroke, air clutch, 36 x 36 Bed
800 Ton Birdsboro Hydraulic Press, 18" stroke, 40" daylight, self-contained

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60 cycle Volts 220/240
5000 Amps. Con. 50° C. Rise

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3 ea. G.E. Type HJTH Form DH
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1350 KVA Cont. 55° C.
Impedance 13.1 Wt. 230000

1—600 KVA G.E. Transformer
No. 4126503
HJTH—Form DD
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Polarity subtractive
667 KVA 55° Cont. rise
Type A single Ph. 60 cycle
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and other testing and
laboratory equipment

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WANTED TO PURCHASE
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Bars—Billets—Sheet—Plate

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WANTED: ONE 6' TO 8' TOP CHARGE DIRECT ARC FURNACE IN GOOD CONDITION COMPLETE WITH ALL ELECTRICS INCLUDING 13800 VOLT PRIMARY ON TRANSFORMER.

BOX H-65
c/o The IRON AGE, Chestnut at 56th, Phila. 39

LARGEST BUYERS
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OF SURPLUS—NEW & USED
Structurals—All Types of Steel
Pipe—Tubing—Tanks—Boilers
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Smith System Manufacturing Co.
212 Ontario Street S. E.
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Industrial publication. Experience library and original research, knowledge of metal working industries required.

Please write details of age, education, experience and salary requirements.

BOX H-62
c/o The IRON AGE, Chestnut at 56th, Phila. 39

WANTED

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Chatham Iron & Metal Co.
P. O. Box 506 Savannah, Georgia

WANTED—WIRE MILL SUPERINTENDENT OR GENERAL FOREMAN. Must be thoroughly experienced both low and high carbon. Also prefer some experience in furnace treating covering cold heading and coating. Position offers excellent opportunity to person who has ambition to better himself with a rapidly expanding cold drawn mill located in the East. Advise complete qualifications and experience. Replies will be held in confidence.

BOX H-63
c/o The IRON AGE, Chestnut at 56th, Phila. 39

TOP METALLURGIST

wanted for Cold Drawn Steel Mill located in the East. Must have thorough background in Laboratory work concerning research and production; also experience with atmosphere control, carbon correction, and annealing furnace work. The person selected must take complete charge of this Department and must have ambition and real initiative to advance to management in overall mill operations. Salary is open. Your reply must cover full and complete resume, which will be held in absolute confidence.

BOX H-64
c/o The IRON AGE, Chestnut at 56th, Phila. 39

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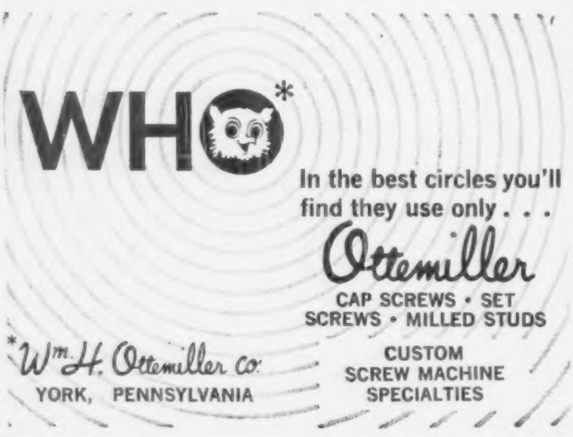

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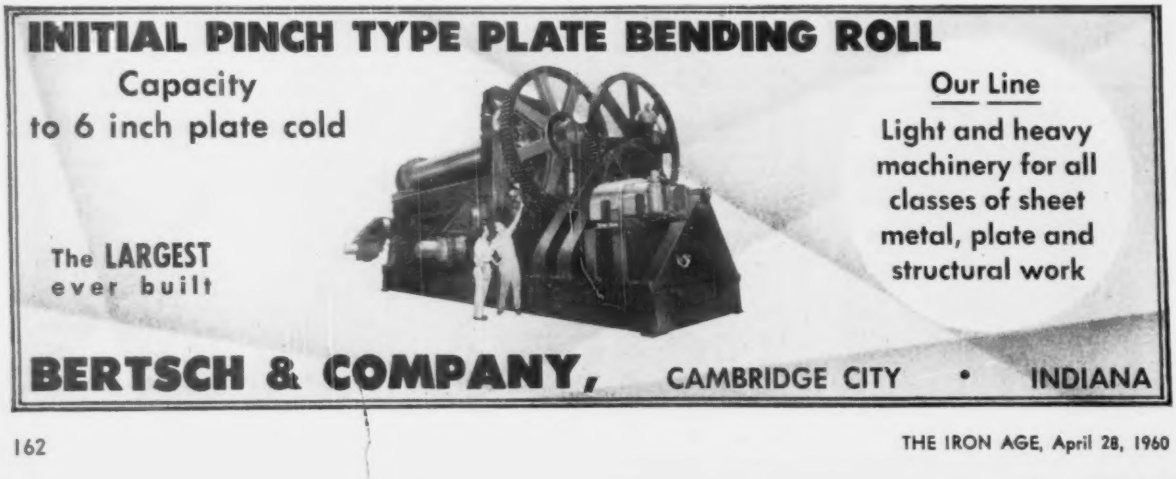

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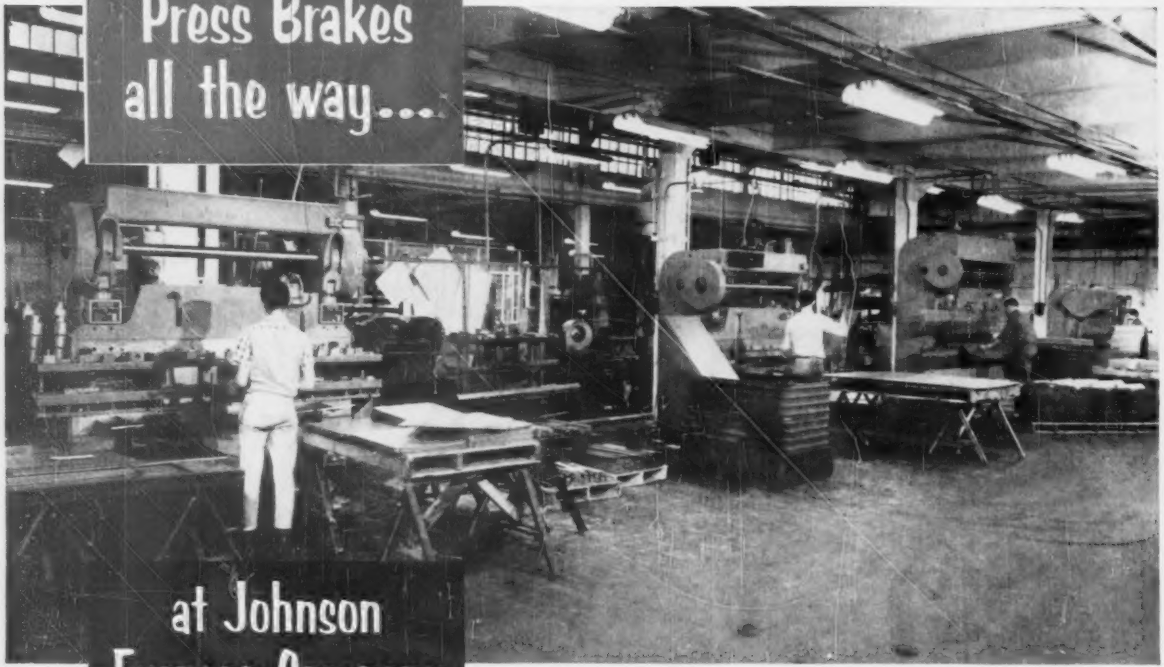

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232-C

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